

BEST AVAILABLE COPY

FIG. 3
Mono S

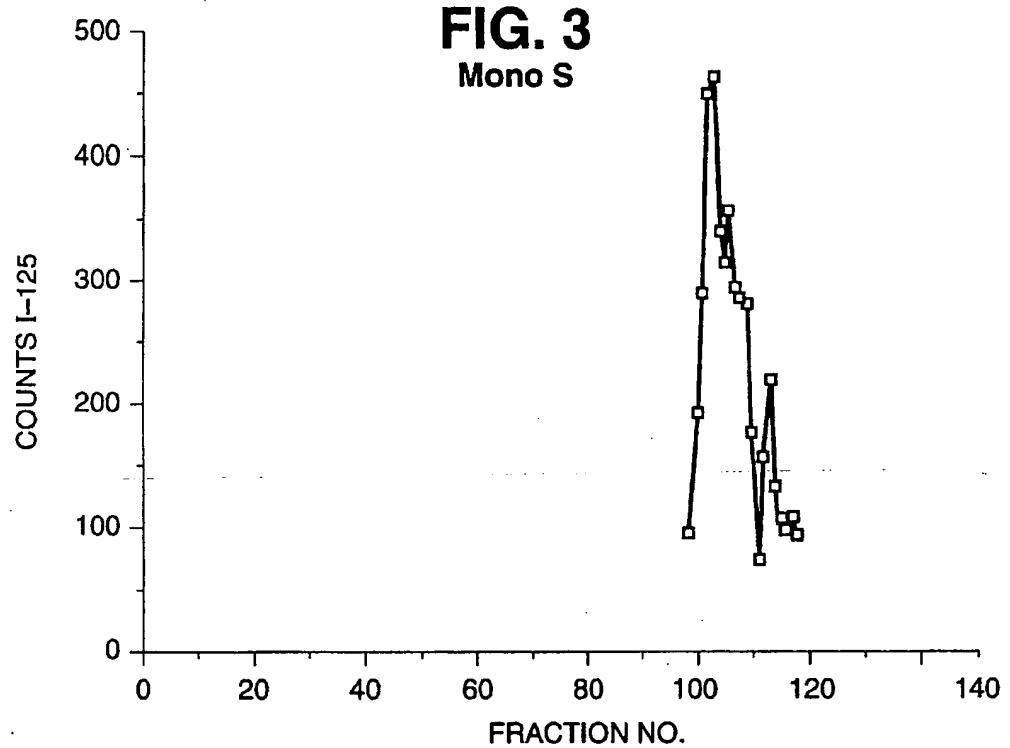
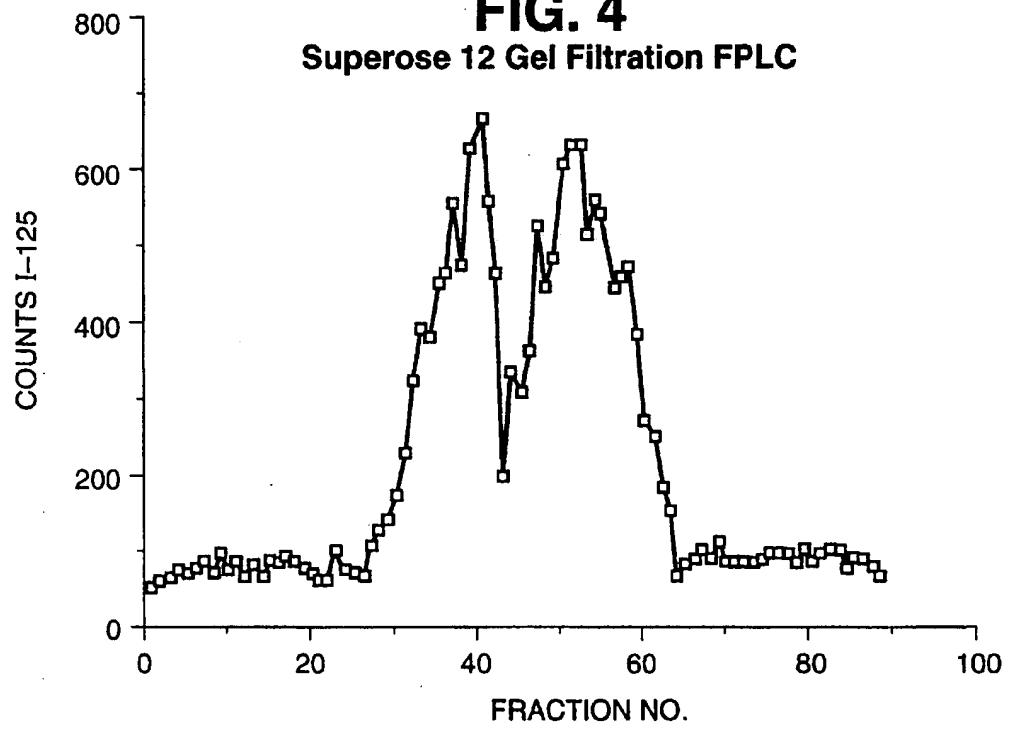


FIG. 4
Superose 12 Gel Filtration FPLC



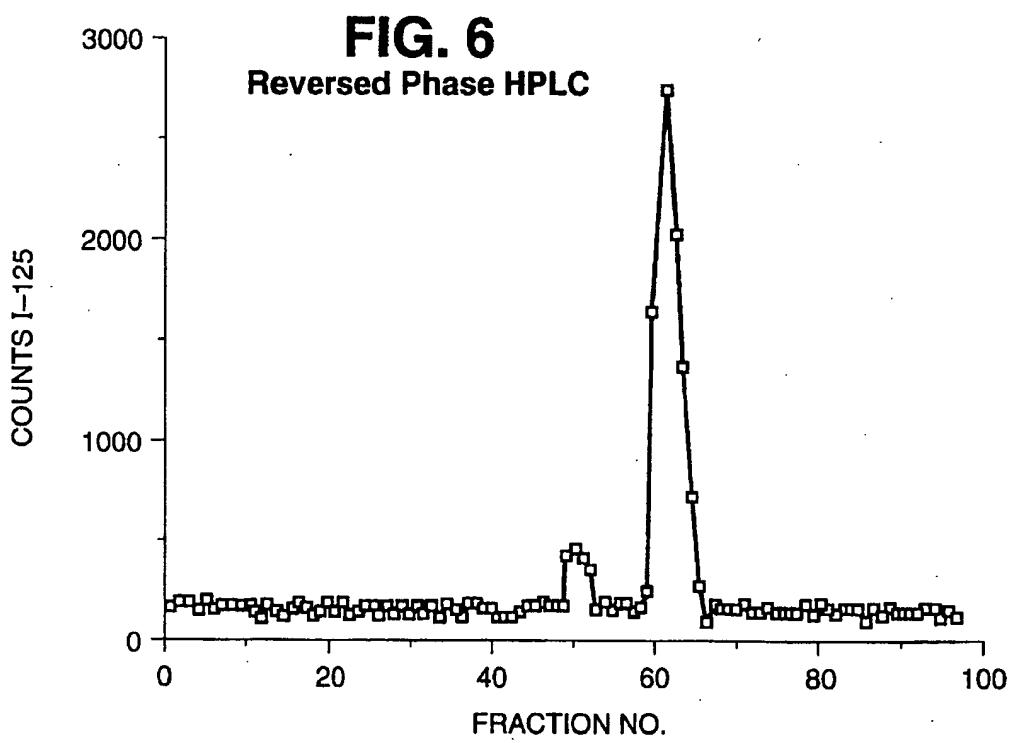
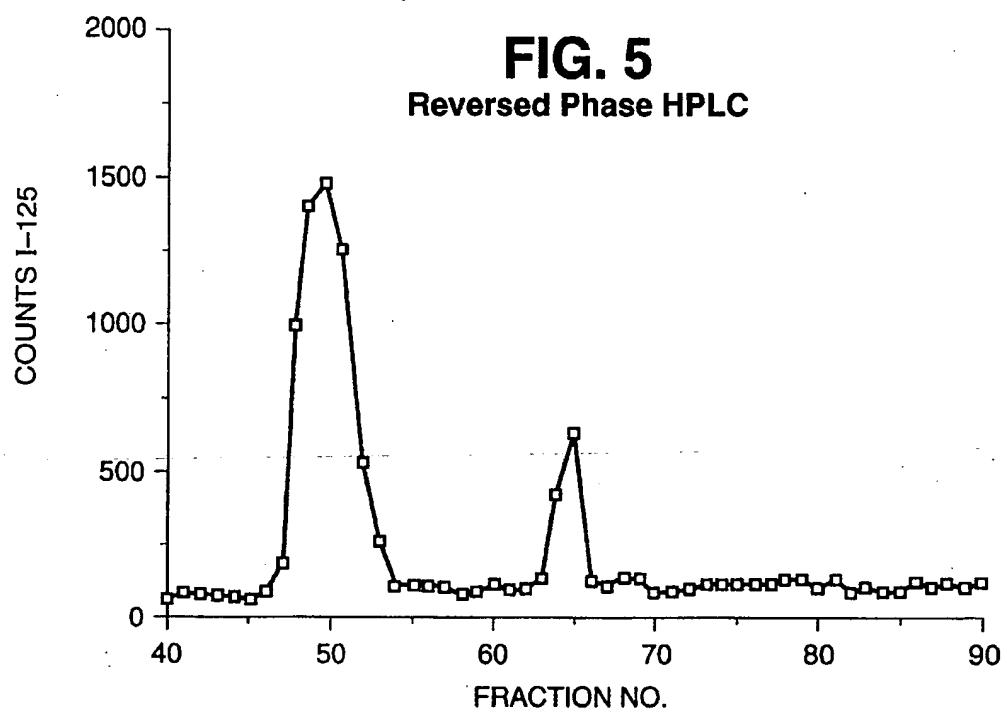


FIG. 7
Factor-I Dose Response
in Serum & Plasma

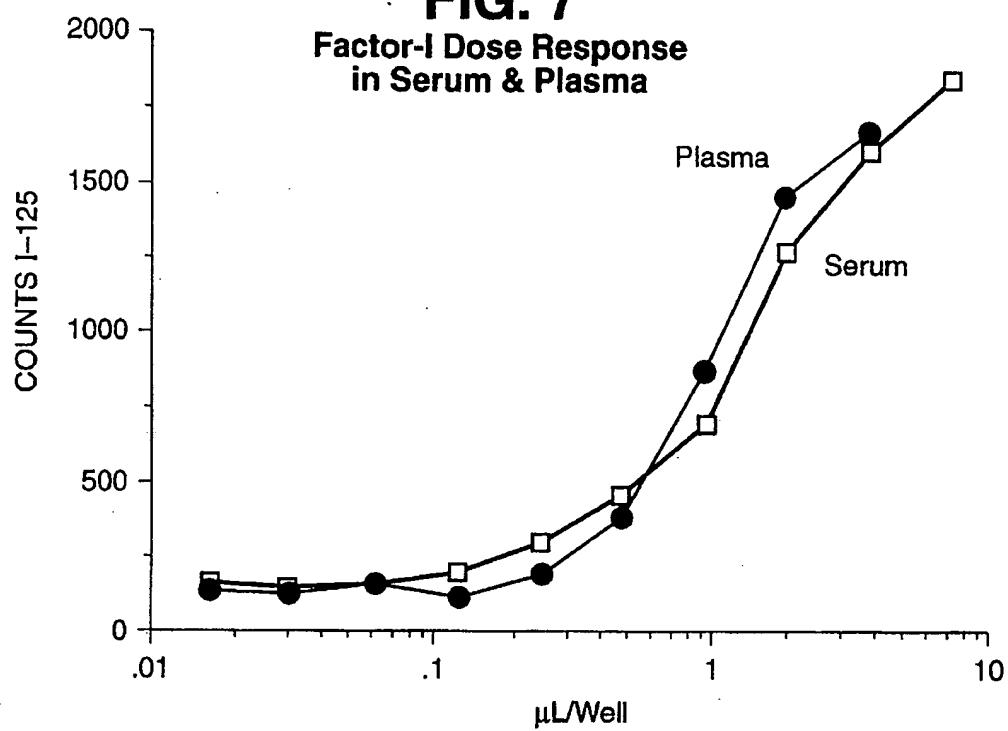


FIG. 8
Factor-II Dose Response
in Serum or Plasma

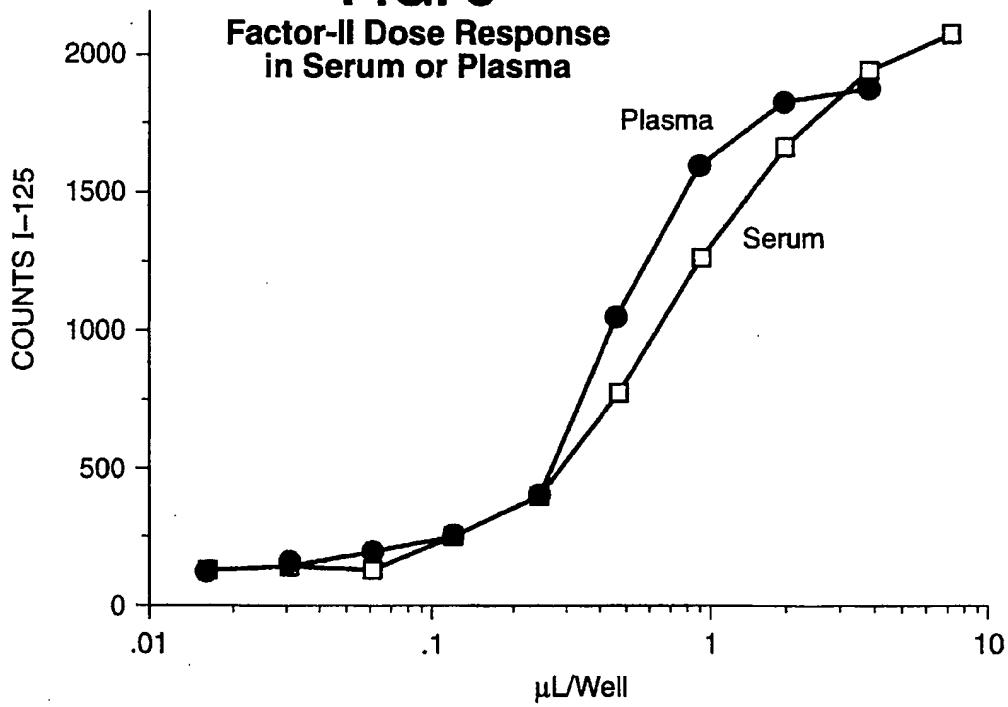


FIG. 9

GGF-I 01 N-terminus F K G D A H T E

(SEQ ID NO: 1)

Trypsin peptides

GGF-I 02	K/R A S L A D E Y E Y M X K *	(SEQ ID NO: 2)
GGF-I 03	K/R T E T S S S G L X L K *	(SEQ ID NO: 3)
GGF-I 04	K/R K L G E M W A E	(SEQ ID NO: 4) HMG-1
GGF-I 05	K/R L G E K R A	(SEQ ID NO: 5) HMG-1?
GGF-I 06	K/R I K S E H A G L S I G D T A K *	(SEQ ID NO: 6) HMG-2
GGF-I 07	K/R A S L A D E Y E Y M R K *	(SEQ ID NO: 7)
GGF-I 08	K/R I K G E H P G L S I G D V A K *	(SEQ ID NO: 8) HMG-1
GGF-I 09	K/R M S E Y A F F V Q T X R *	(SEQ ID NO: 9) HMG-2
GGF-I 10	K/R S E H P G L S I G D T A K *	(SEQ ID NO: 10) HMG-1
GGF-I 11	K/R A G Y F A E X A R *	(SEQ ID NO: 11)
GGF-I 12	K/R K L E F L X A K *	(SEQ ID NO: 12)
GGF-I 13	K/R T T E M A S E Q G A	(SEQ ID NO: 13)
GGF-I 14	K/R A K E A L A A L K *	(SEQ ID NO: 14)
GGF-I 15	K/R F V L Q A K K *	(SEQ ID NO: 15)
GGF-I 16	K/R L G E M W	(SEQ ID NO: 16) HMG-1

Protease V8 peptides

GGF-I 17	E T Q P D P G Q I L K K V P M V I G A Y T	(SEQ ID NO: 169)
GGF-I 18	E Y K C L K F K W F K K A T V M	(SEQ ID NO: 17)
GGF-I 19	E A K Y F S K X D A	(SEQ ID NO: 18) LH-alpha
GGF-I 20	E X K F Y V P	(SEQ ID NO: 19) LH-beta
GGF-I 21	E L S F A S V R L P G C P P G V D P M V S F P V A L	(SEQ ID NO: 20)

FIG. 10

A

GGF-I	01	F K G D A H T E	(SEQ ID NO: 1)
GGF-I	02	A S L A D E Y E Y M X K	(SEQ ID NO: 22)
GGF-I	03	T E T S S S G L X L K	(SEQ ID NO: 23)
GGF-I	07	A S L A D E Y E Y M R K	(SEQ ID NO: 24)
GGF-I	11	A G Y F A E X A R	(SEQ ID NO: 25)
GGF-I	13	T T E M A S E Q G A	(SEQ ID NO: 26)
GGF-I	14	A K E A L A A L K	(SEQ ID NO: 27)
GGF-I	15	F V L Q A K K	(SEQ ID NO: 28)
GGF-I	17	E T Q P D P G Q I L K K V P M V I G A Y T	(SEQ ID NO: 29)
GGF-I	18	E Y K C L K F K W F K K A T V M	(SEQ ID NO: 17)

B

GGF-I	20	E X K F Y V P	(SEQ ID NO: 19)
GGF-I	12	K L E F L X A K	(SEQ ID NO: 32)

FIG. 11

Trypsin peptides	
GGF-II 01	K/R V H Q V W A A K * (SEQ ID NO: 33)
GGF-II 02	K/R Y I F F M E P E A X S S G (SEQ ID NO: 34)
GGF-II 03	K/R L G A W G P P A F P V X Y (SEQ ID NO: 35)
GGF-II 04	K/R W F V V I E G K * (SEQ ID NO: 36)
GGF-II 05	K/R A L A A A G Y D V E K * Histone H1 (SEQ ID NO: 164)
GGF-II 06	K/R L V L R * (SEQ ID NO: 165)
GGF-II 07	K/R X X Y P G Q I T S N (SEQ ID NO: 166)
GGF-II 08	K/R A S P V S V G S V Q E L V Q R * (SEQ ID NO: 37)
GGF-II 09	K/R V C L L T V A A P P T (SEQ ID NO: 38)
GGF-II 10	K/R D L L L X V (SEQ ID NO: 39)

LYSYL Endopeptidase-C peptides	
GGF-II 11	K V H Q V W A A K * (SEQ ID NO: 51)
GGF-II 12	K A S L A D S G E Y M X K * (SEQ ID NO: 52)

FIG. 12

A

GGF-II 01	V H Q V W A A K	(SEQ ID NO: 45)
GGF-II 02	Y I F F M E P E A X S S G	(SEQ ID NO: 46)
GGF-II 03	L G A W G P P A F P V X Y	(SEQ ID NO: 47)
GGF-II 04	W F V V I E G K	(SEQ ID NO: 48)
GGF-II 08	A S P V S V G S V Q E L V Q R	(SEQ ID NO: 49)
GGF-II 09	V C L L T V A A P P T	(SEQ ID NO: 50)
GGF-II 11	K V H Q V W A A K	(SEQ ID NO: 51)
GGF-II 12	K A S L A D S G E Y M X K	(SEQ ID NO: 52)

B Novel Factor II Peptides - others

GGF-II 10 D L L L X V
(SEQ ID NO: 53)

FIG. 13

Comparison of BrdU-ELISA and [¹²⁵I]UdR Counting Method for the DNA Synthesis Assay in Schwann Cell Cultures

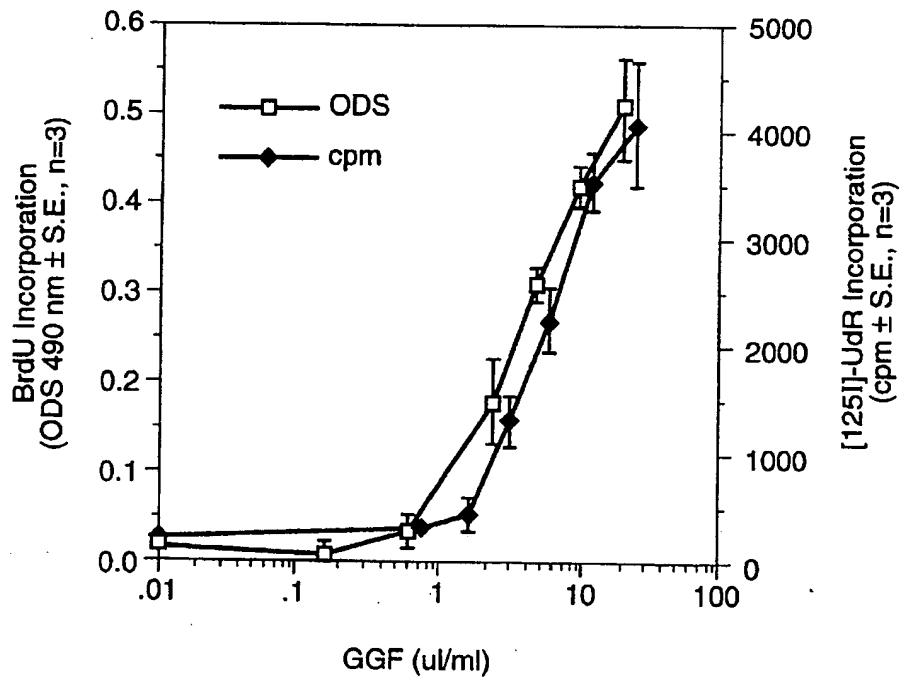


FIG. 14A
**Comparison of Br-UdR Immunoreactivity
and Br-UdR Labelled Cell Number**

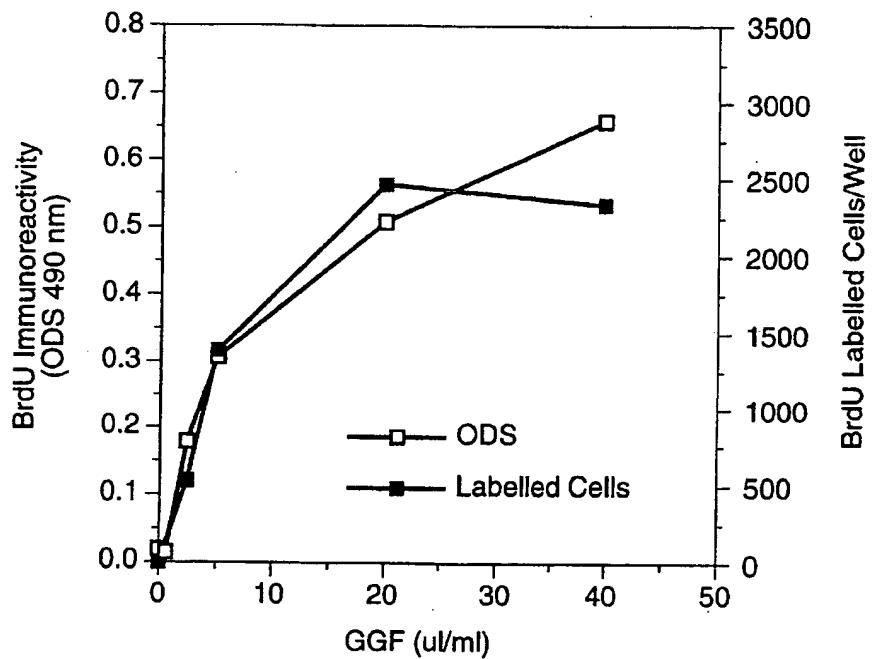


FIG. 14B
**Comparison of Br-UdR Immunoreactivity
and Br-UdR Labelled Cell Number**

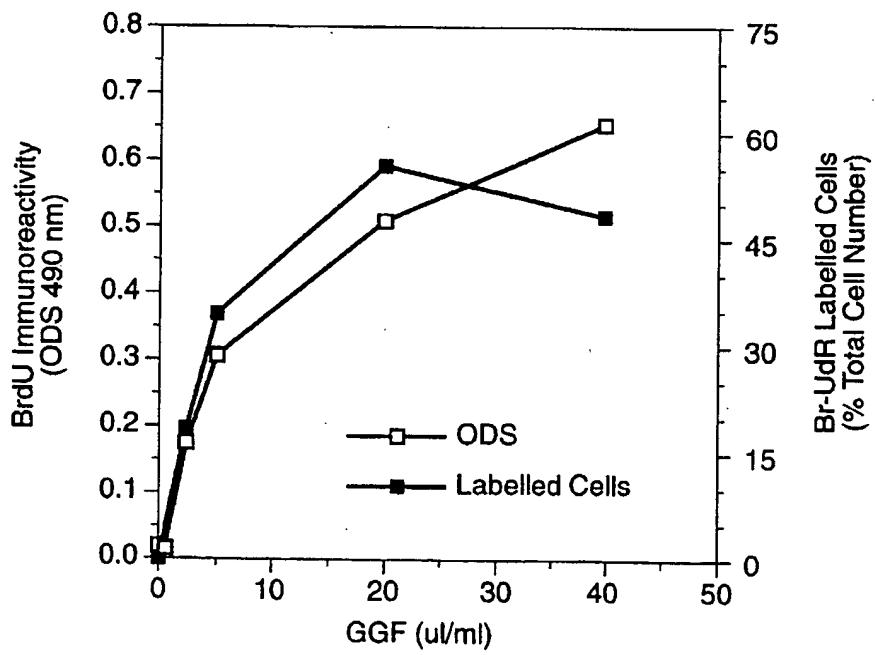


FIG. 15
Mitogenic Response of Rat Sciatic Nerve Schwann cell to GGFs

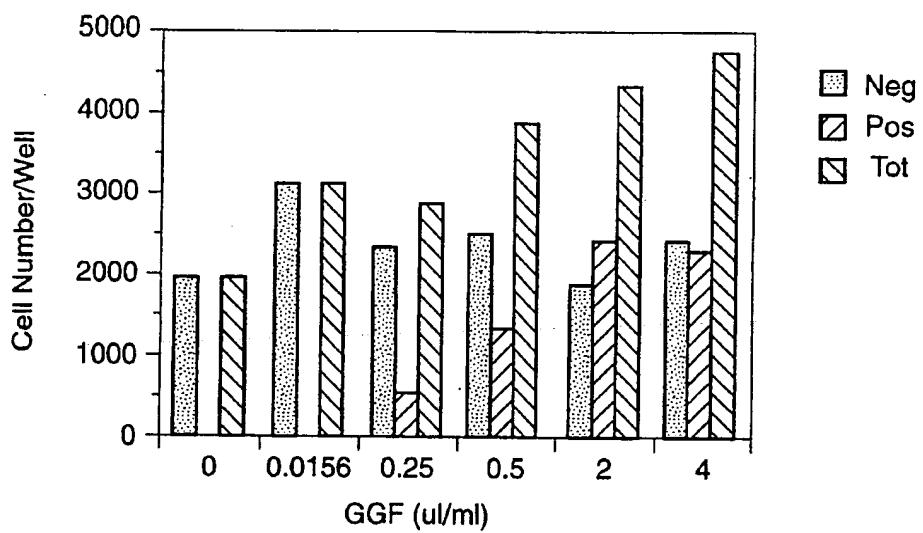


FIG. 16
DNA Synthesis in Rat Sciatic Nerve Schwann Cells and 3T3 Fibroblasts in the presence of GGFs

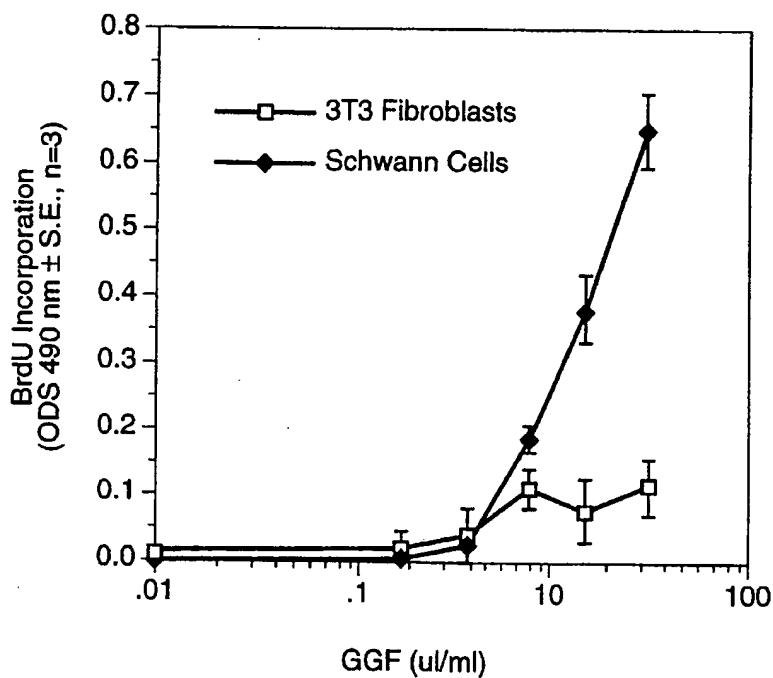


FIG. 17
Mitogenic Response of
BHK 21 C13 Cells to FCS and GGFs

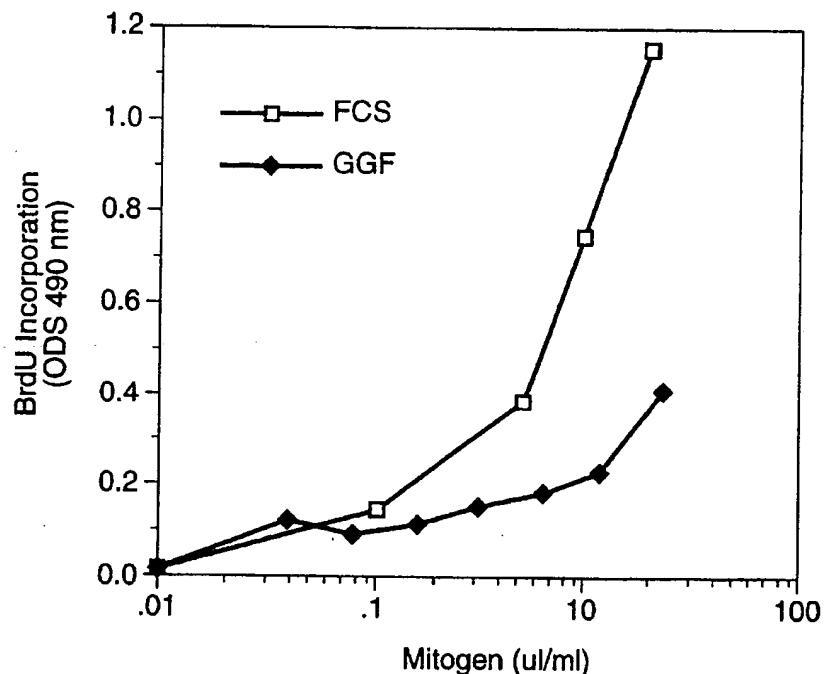


FIG. 18
Survival and Proliferation of BHK21 C13 Cell
Microcultures After 48 Hours in Presence of GGFs

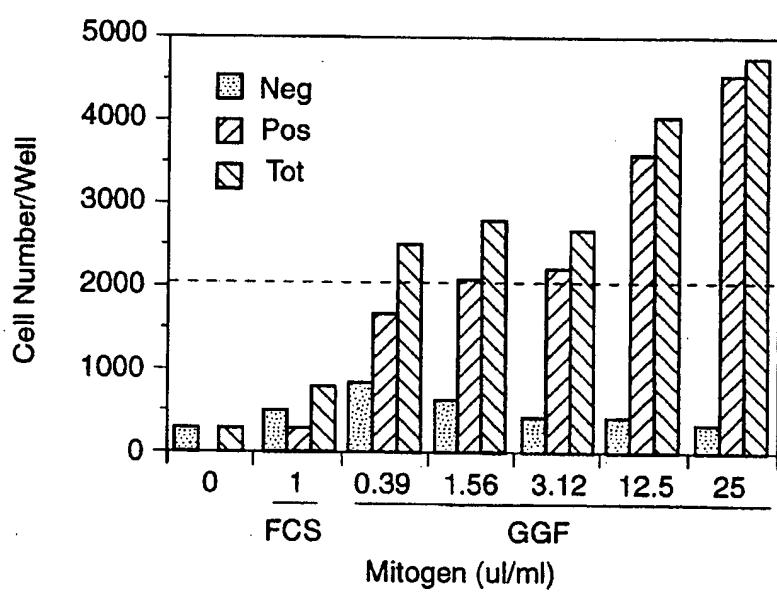


FIG. 19
Mitogenic Response
of C6 Cells to FCS

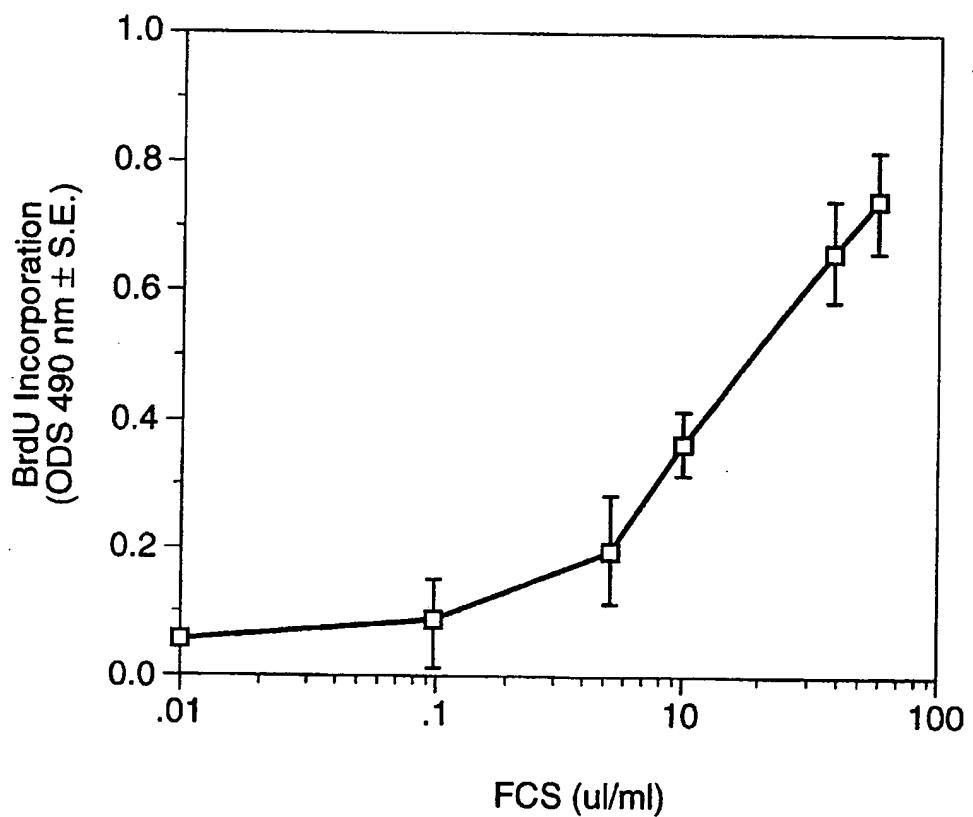


FIG. 20A
Mitogenic Response of
C6 Cells to aFGF & GGFs

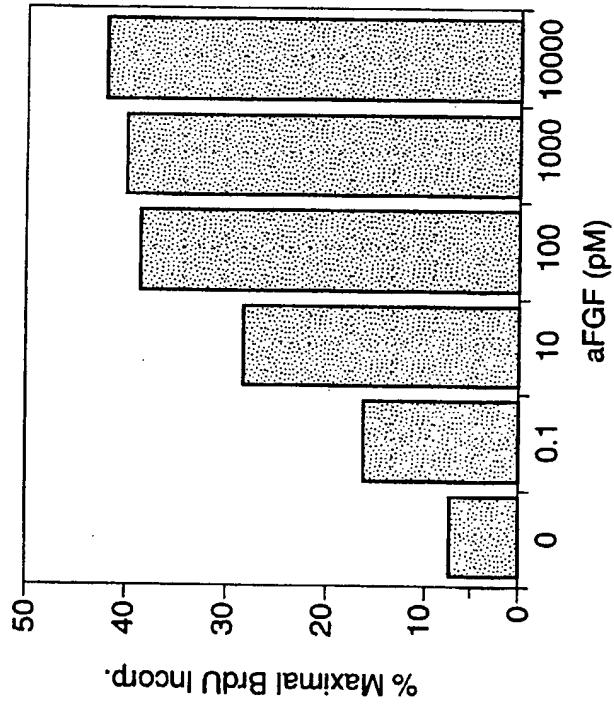


FIG. 20B
Mitogenic Response of
C6 Cells to aFGF & GGFs

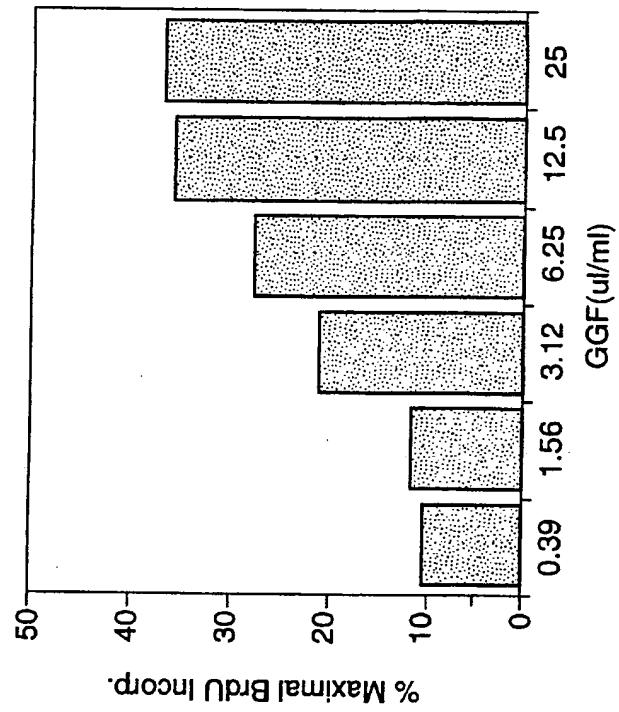


FIG. 21

Degenerate Oligonucleotide Probes for Factor I & Factor II

Oligo	Sequence	Peptide	
535	TTYAARGGNGAYGCNCAYAC!	GGFI-1	(SEQ ID NO: 54)
536	CATRTAYTCRTAYTCRTCNGC!	GGFI-2	(SEQ ID NO: 55)
537	TGYTCNGANGCCATYTCNGT!	GGFI-13	(SEQ ID NO: 56)
538	TGYTCRCTNGCCATYTCNGT!	GGFI-13	(SEQ ID NO: 57)
539	CCDATNACCATNGGNACYTT!	GGFI-17	(SEQ ID NO: 58)
540	GCNGCCCANACYTGRTGNAC!	GGFII-1	(SEQ ID NO: 59)
541	GCYTCNGGYTCCATRAARAA!	GGFII-2	(SEQ ID NO: 60)
542	CCYTCDATNACNACRAACCA!	GGFII-4	(SEQ ID NO: 61)
543	TCNGCRAARTANCCNGC!	GGFI-11	(SEQ ID NO: 62)
544	GCNGCNAGNGCYTCYTTNGC!	GGFI-14	(SEQ ID NO: 63)
545	GCNGCYAANGCYTCYTTNGC!	GGFI-14	(SEQ ID NO: 64)
546	TTYTTNGCYTGNAGNACRAA!	GGFI-15	(SEQ ID NO: 65)
551	TTYTTNGCYTGYAANACRAA!	GGFI-15	(SEQ ID NO: 66)
568	TGNACNAGYTCYTGNAc!	GGFII-8	(SEQ ID NO: 67)
569	TGNACYAAYTCYTGNAc!	GGFII-8	(SEQ ID NO: 68)
609	CATRTAYTCNCCNGARTCNGC!	GGFII-12	(SEQ ID NO: 69)
610	CATRTAYTCNCCRCTRTCNGC!	GGFII-12	(SEQ ID NO: 70)
649	NGARTCNGCYAANGANGCYTT!	GGFII-12	(SEQ ID NO: 71)
650	NGARTCNGCNAGNGANGCYTT!	GGFII-12	(SEQ ID NO: 72)
651	RCTRTCNGCYAANGANGCYTT!	GGFII-12	(SEQ ID NO: 73)
652	RCTRTCNGCNAGNGANGCYTT!	GGFII-12	(SEQ ID NO: 74)
653	NGARTCNGCYAARCTNGCYTT!	GGFII-12	(SEQ ID NO: 75)
654	NGARTCNGCNAGRCTNGCYTT!	GGFII-12	(SEQ ID NO: 76)
655	RCTRTCNGCYAARCTNGCYTT!	GGFII-12	(SEQ ID NO: 78)
656	RCTRCTNGCNAGRCTNGCYTT!	GGFII-12	(SEQ ID NO: 79)
659	ACNACNGARATGGCTCNNGA!	GGFI-13	(SEQ ID NO: 80)
660	ACNACNGARATGGCAGYNGA!	GGFI-13	(SEQ ID NO: 81)
661	CAYCARGTNTGGCNGCNAA!	GGFII-1	(SEQ ID NO: 82)
662	TTYGTNGTNATHGARGGNAA!	GGFII-4	(SEQ ID NO: 83)
663	AARGGNGAYGCNCAYACNGA!	GGFI-1	(SEQ ID NO: 84)
664	GARGCNYTNGCNGCNYTNAA!	GGDI-14	(SEQ ID NO: 85)
665	GTNGGGNTCNGTNCARGARYT!	GGFII-8	(SEQ ID NO: 86)
666	GTNGGGNAGYGTNCARGARYT!	GGFII-8	(SEQ ID NO: 87)
694	NACYTTYTTNARHATYTGNC!	GGFI-17	(SEQ ID NO: 88)

FIG. 22

Putative Bovine Factor II Gene Sequences

SEQ ID NO: 89:

TCTAA AAC TAC AGA GAC TGT ATT TTC ATG ATC ATC ATA GTT CTG TGA AAT ATA	53
Asn Tyr Arg Asp Cys Ile Phe Met Ile Ile Val Leu Xaa Asn Ile	
C TT AAA CCG CTT TGG TCC TGA TCT TGT AGG AAG TCA GAA CTT CGC ATT	101
Leu Lys Pro Leu Trp Ser Xaa Ser Cys Arg Lys Ser Glu Leu Arg Ile	
AGC AAA GCG TCA CTG GCT GAT TCT GGA GAA TAT ATG TGC AAA GTG ATC	149
Ser Lys Ala Ser Leu Ala Asp Ser Gly Glu Ser Met Cys Lys Val Ile	
AGC AAA CTA GGA AAT GAC AGT GCC TCT GCC AAC ATC ACC ATT GTG GAG	197
Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Arg Ile Val Glu	
TCA AAC GGT AAG AGA TGC CTA CTG CGT GCT ATT TCT CAG TCT CTA AGA	245
Ser Asn Gly Lys Arg Cys Leu Leu Arg Ala Ile Ser Gln Ser Leu Arg	
GGA GTG ATC AAG GTA TGT GGT CAC ACT TGA ATC ACG CAG GTG TGT GAA	293
Gly Val Ile Lys Val Cys Gly His Thr Xaa Ile Thr Gln Val Cys Glu	
ATC TCA TTG TGA ACA AAT AAA AAT CAT GAA AGG AAA ACT CTA TGT TTG	341
Ile Ser Cys Xaa Thr Asn Lys Asn His Glu Arg Lys Thr Leu Cys Leu	
AAA TAT CCTT ATG GGT CCT CCT GTA AAG CTC TTC ACT CCA TAA GGT GAA	389
Lys Tyr Leu Met Gly Pro Pro Val Lys Leu Phe Thr Pro Xaa Gly Glu	
ATA GAC CTG AAA TAT ATA TAG ATT ATT T	417
Ile Asp Leu Lys Tyr Ile Xaa Ile Ile	

FIG. 23A
PCR Primers for Factor I & Factor II

Degenerate PCR Primers

Oligo	Sequence	Peptide
657	CCGAATTCTGCAGGARACNCARCCNGAYCCNNGG!	GGFI-17 (SEQ ID NO: 90)
658	AAGGATCCTGCAGNGTTRTANGCNCCCHATNACCATNGG!	GGFI-17 (SEQ ID NO: 91)
667	CCGAATTCTGCAGGCGNGAYTCNGGNNGARTAYATG!	GGFII-12 (SEQ ID NO: 92)
668	CCGAATTCTGCAGGCGNGAYATYGGNGARTAYAT!	GGFII-12 (SEQ ID NO: 93)
669	AAGGATCCTGCAGNNNCATRTAYTCNCNGARTC!	GGFII-12 (SEQ ID NO: 94)
670	AAGGATCCTGCAGNNNCATRTAYTCNCRRRTTC!	GGFII-12 (SEQ ID NO: 95)
671	CCGAATTCTGCAGGAYCARGTNTGGCNGCNA!	GGFII-1 (SEQ ID NO: 96)
672	CCGAATTCTGCAGATRRTTYATGGGARCCNGARG!	GGFII-2 (SEQ ID NO: 97)
673	CCGAATTCTGCAGGGGGNCCNCCNGCNTTYCCNGT!	GGFII-3 (SEQ ID NO: 98)
674	CCGAATTCTGCAGTGGTTYGTTNGTNATHGARGC!	GGFII-4 (SEQ ID NO: 99)
677	AAGGATCCTGCAGYTNGCNGCCANACYTGRTG!	GGFII-1 (SEQ ID NO: 100)
678	AAGGATCCTGCAGGYCTCNGGYTCCATRAARA!	GGFII-2 (SEQ ID NO: 101)
679	AAGGATCCTGCAGACNGGRAANGCNGGGNC!	GGFII-3 (SEQ ID NO: 102)
680	AAGGATCCTGCAGYTINCCYTCDATNACNACRAAC!	GGFII-4 (SEQ ID NO: 103)
681	CATRTAYTCRTAYTCTCNGCAAGGATCCCTGCAG!	GGFI-2 (SEQ ID NO: 104)
682	CCGAATTCTGCAGAARGGNGAYGCNAYACNGA!	GGFI-1 (SEQ ID NO: 105)
683	GCNGCYAANGCYRCYTTINGCAAGGATCCCTGCAG!	GGFI-14 (SEQ ID NO: 106)
684	GCNGCNAGNGCYTCYTTNGCAAGGATCCCTGCAG!	GGFI-14 (SEQ ID NO: 107)
685	TCNGCRAARTANCNGCAAGGATCCCTGCAG!	GGFII-1 (SEQ ID NO: 108)

Unique PCR Primers for Factor II

FIG. 23B PCR Primers for Factor I & Factor II

Oligo	Sequence	Comment
711	CATCGATCTGGCAGGCTGATTCTGGAGAAATATAATGTGCA!	3' RACE (SEQ ID NO: 109)
712	AAGGATCCCTGCAGGCCACATCTCGAGTCGACATCGATT!	3' RACE (SEQ ID NO: 110)
713	CCGAATTCTGCAGTGTGATCAGCAAACCTAGGAAATGACA!	3' RACE (SEQ ID NO: 111)
721	CATCGATCTGCAGCCTAGTTGCTGATCAGTTGCAC!	5' RACE (SEQ ID NO: 112)
722	AAGGATCCCTGCAGTATATTCTCCAGAATCAGCCAGTG!	5' RACE; ANCHORED (SEQ ID NO: 113)
725	AAGGATCCCTGCAGGGCACGGCAGTAGGCATCTCTTA!	EXON A (SEQ ID NO: 114)
726	CCGAATTCTGCAGGCCAGAACTTCGCATTAGCAAAGC!	EXON A (SEQ ID NO: 115)
771	CATCCCCGGGATGAAGAGTCAGGAGTCTGTGGCA!	EXONS B+A (SEQ ID NO: 116)
772	ATACCCGGGCTGCAGACAATGAGATTACACACACCTGCG!	(SEQ ID NO: 117)
773	AAGGATCCCTGCAGTTGGAAACCTGCCACAGACTCCT!	ANCHORED (SEQ ID NO: 118)
776	ATACCCGGGCTGCAGATGAGATTACACACACCTGCGTGAA!	EXONS B+A (SEQ ID NO: 119)

FIG. 24
Summary of Contiguous GGF-II
cDNA Structures & Sequences

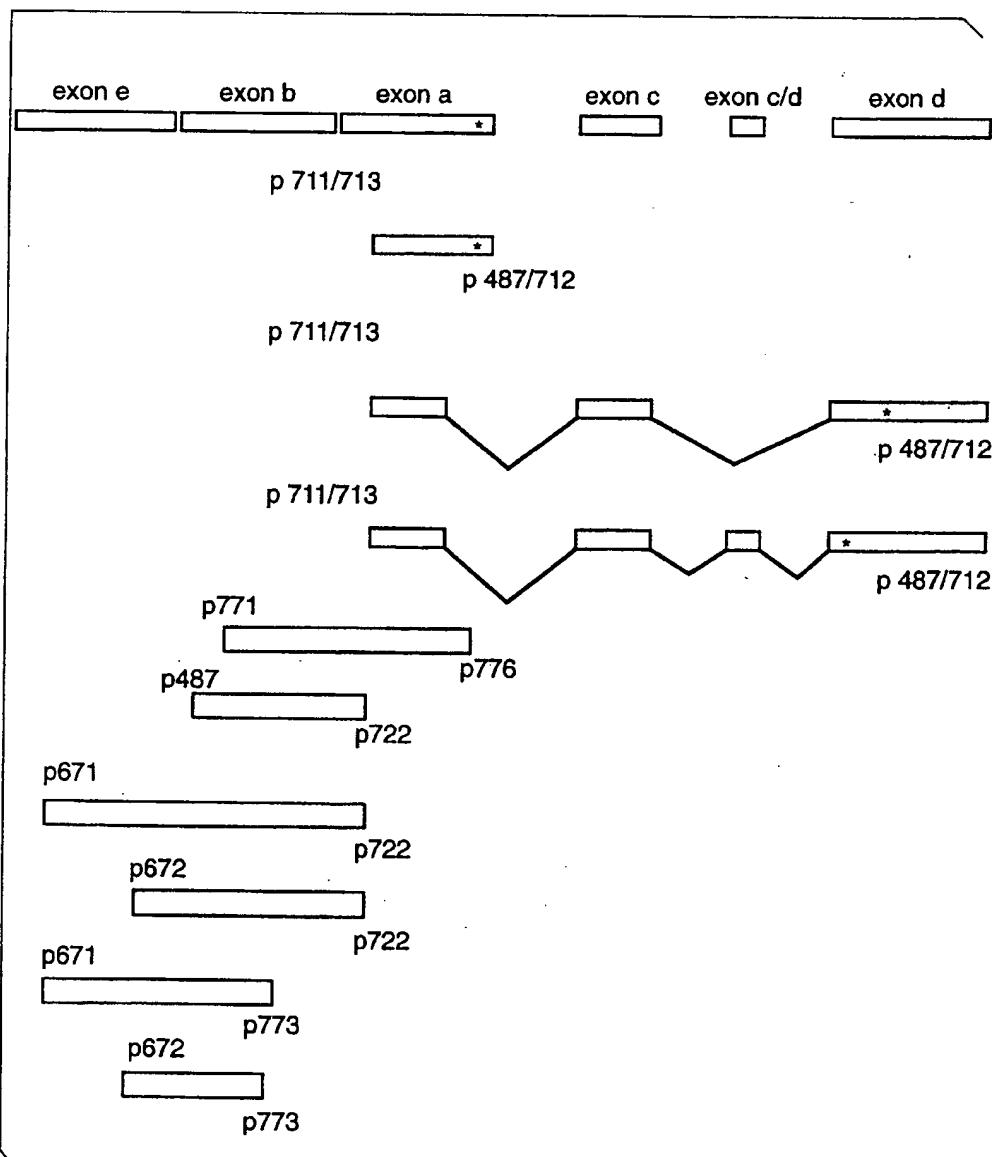


FIG. 25

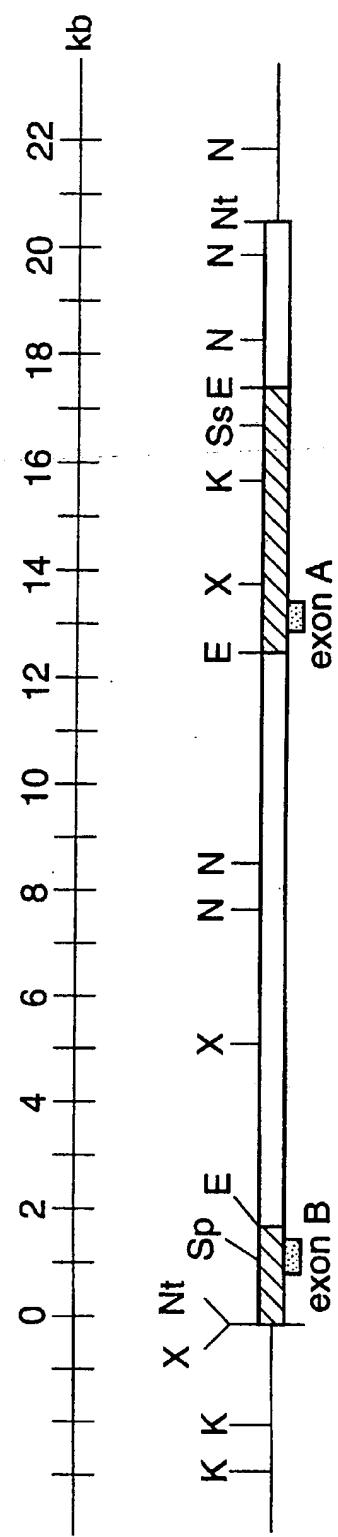


FIG. 26
Alternative Gene Products of Putative Bovine GGF-II

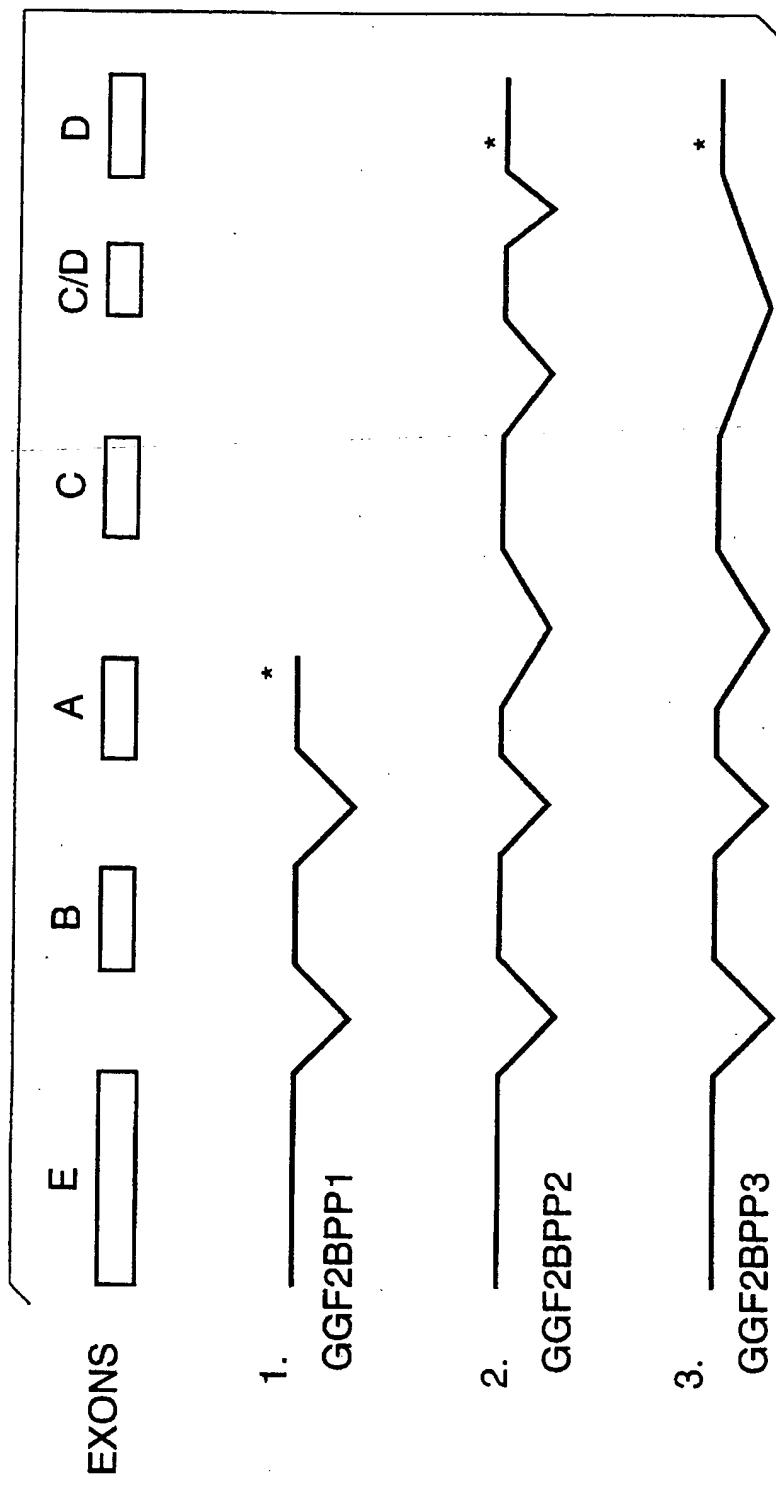


FIG. 27

GGF-II Peptides Identified in Deduced Amino Acid Sequences of Putative Bovine GGF-II Proteins

Peptide	Pos.	Sequence match	ID Sequences
II-1		VHQVWAAK	
	1:	HQVWAAK AAGLK	(SEQ ID NO:120)
II-10		DLLLXV	
	14:	GGLKK dslltv RLGAW	(SEQ ID NO:121)
II-03		LGAWGPPAFPVXY	(SEQ ID NO:122)
	21:	LLTVR lgawghpafpscgl RLKED	(SEQ ID NO:123)
II-02		YIFFMEPEAXSSG	(SEQ ID NO:124)
	41:	KEDSR YIFFMEPEANSSG GPGRL	(SEQ ID NO:125)
II-6		LVLR	
	103:	VAGSK LVLR CETSS	(SEQ ID NO:126)
I-18		EYKCLKFKWFKKATVM	(SEQ ID NO:127)
	112:	CETSS eysslkfkwfknsgsel SRKNK	(SEQ ID NO:128)
II-12		KASLADSGEYMXK	(SEQ ID NO:129)
	151:	ELRIS KASLADSGEYMCN VISKL	(SEQ ID NO:130)
I-07		ASLADEYEYMRK	(SEQ ID NO:131)
	152:	LRISK asladsgeymck VISKL	(SEQ ID NO:132)

FIG. 28A

SEQ ID NO: 133:

CCTGCAG	CAT CAA GTG TGG GCG AAA GCC GGG CCC TTG AAG AAG GAC TCG TCG	55
His Gln Val Trp Ala Ala Lys Ala Gly Leu Lys Asp Ser Leu		
CTC ACC	GTC CGC CTG GGC GGC TGG GGC CAC CCC GCC TTC CCC TCC TGC	103
Leu Thr Val Arg Leu Gly Ala Trp Gly His Pro Ala Phe Pro Ser Cys		
GGG CGC	CTC AAG GAG GAC AGG TAC ATC TTC TRC ATG GAG CCC GAG	151
Gly Arg Lys Glu Asp Ser Arg Tyr Ile Phe Met Glu Pro Glu		
GCC AAC AGC AGC GGC GGG CCC GGC CGC CTT CCG AGC CTC CTT CCC CCC	199	
Ala Asn Ser Ser Gly Pro Gly Pro Gly Arg Leu Pro Ser Leu Leu Pro Pro		
TCT CGA GAC GGG CCG GAA CCT CAA GAA GGA GGT CAG CCG GGT GCT GTG	247	
Ser Arg Asp Gly Pro Glu Pro Gln Glu Gly Gln Pro Gly Ala Val		
CAA CGG TGC GCC TGT CCT CCC CGC TTG AAA GAG ATG AAG ACT CAG GAG	295	
Gln Arg Cys Ala Leu Pro Pro Arg Leu Lys Glu Met Lys Ser Gln Glu		
TCT GTG GCA GGT TCC AAA CTA GTG CTT CGG TGC GAG ACC AGT TCT GAA	343	
Ser Val Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu		
TAC TCC TCT CTC AAG TTC AAG TGG TTC AAG AAT GGG AGT GAA TTA AGC	391	
Tyr Ser Ser Leu Lys Phe Lys Trp Phe Lys Asn Gly Ser Glu Leu Ser		
CGA AAC AAC CCA GAA AAC ATC AAG ATA CAG AAA AGG CCG GGG AAC	439	
Arg Lys Asn Lys Pro Glu Asn Ile Lys Ile Gln Lys Arg Pro Gly Lys		
TCA GAA CTT CGC ATT AGC AAA GCG TCA CTG GCT GAT TCT GGA GAA TAT	487	
Ser Glu Leu Arg Ile Ser Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr		
ATG TGC AAA GTG ATC AGC AAA CTA GGA AAT GAC AGT GCC TCT GCC AAC	535	
Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn		
ATC ACC ATT GTG GAG TCA AAC GGT AAG AGA TGC CTA CTG CGT GCT ATT	583	
Ile Thr Ile Val Glu Ser Asn Gly Lys Arg Cys Leu Leu Arg Ala Ile		
TCT CAG TCT CTA AGA GGA GTG ATC AAG GTA TGT GGT CAC ACT	625	
Ser Gln Ser Leu Arg Gly Val Ile Lys Val Cys Gly His Thr		
TGAATCACGCC AGGTGTGTGA AATCTCATTTG TGAAACAATA AAAATCATGA AAGGAAAAAA	685	
AAAAAAAAA AATCGATGTC GACTCGAGAT GTGGCTGCAG GTGGACTCTA GAGGATCCC	744	

FIG. 28B

Nucleotide Sequences & Deduced Amino Acid Sequences of GGF2BPP2

SEQ ID NO: 134:

CCTGCAG CAT CAA GTG TGG GCG GCG AAA	GCC GGG GGC TTG AAG AAG GAC TCG CTG	55
His Gln Val Trp Ala Ala Lys Ala	Gly Leu Lys Asp Ser Leu	
CTC ACC GTG CGC CTG GGC GCC TGG GGC CAC CCC GCC TTC CCC TCC TGC	TTC Pro Ala Phe Pro Ser Cys	103
Leu Thr Val Arg Leu Gly Ala Trp Gly His Pro		
GGG CGC CTC AAG GAG GAC AGC AGG TAC ATC TTC TIC ATG GAG CCC GAG		151
Gly Arg Leu Lys Glu Asp Ser Arg Tyr Ile Phe Met Glu Pro Glu		
GCC AAC AGC AGC GGC GGG CCC GGC CGC CTT CCG AGC CTC CTT CCC CCC		199
Ala Lys Ser Ser Gly Gly Pro Gly Arg Leu Pro Ser Leu Leu Pro Pro		
TCT CGA GAC GGG CCG GAA CCT CAA GAA GGA GGT CAG CCG GGT GCT GTG		247
Ser Arg Asp Gly Pro Glu Pro Gln Glu Gly Gln Pro Gly Ala Val		
CAA CGG TGC GCC TTG CCT CCC CGC TTG AAA GAG ATG AAG AGT CAG GAG		295
Gln Arg Cys Ala Leu Pro Pro Arg Leu Lys Glu Met Lys Ser Gln Glu		
TCT GTG GCA GGT TCC AAA CTA GTG CTT CGG TGC GAG ACC AGT TCT GAA		343
Ser Val Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu		
TAC TCC TCT AAG TTC AAG TGG TTG AAT GGG AGT GAA TTA AGC		391
Tyr Ser Ser Leu Lys Phe Lys Trp Phe Lys Asn Gly Ser Glu Leu Ser		
CGA AAG AAC AAA CCA GAA AAC ATC AAG ATA CAG AAA AGG CCG GGG AAG		439
Arg Lys Asn Lys Gly Asn Ile Lys Ile Gln Lys Arg Pro Gly Lys		
TCA GAA CTT CGC ATT AGC AAA GCG TCA CTG GCT GAT TCT GGA GAA TAT		487
Ser Glu Leu Arg Ile Ser Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr		
ATG TGC AAA GTG ATC AGC AAA CTA GGA AAT GAC AGT GCC TCT GCC AAC		
Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn		535

FIG. 28C

Nucleotide Sequences & Deduced Amino Acid Sequences of GG2BPP2

ATC ACC ATT GTG GAG TCA AAC GCC ACA TCC ACA TCT ACA GCT GGG ACA Ile Thr Ile Val Glu Ser Asn <u>Ala</u> Thr Ser Thr Ser Thr Ala Gly Thr	583
AGC CAT CRT GTC AAG TGT GCA GAG AAG AAA ACT TTC TGT GTG AAT Ser His Leu Val Lys Ser Ala Glu Lys Glu Lys Thr Phe Cys Val Asn	631
GGA GGC GAG TGC TTC ATG GTG AAA GAC CTT TCA AAT CCC TCA AGA TAC Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr	679
TTG TGC AAG TGC CAA CCT GGA TTC ACT GGA GCG AGA TGT ACT GAG AAT Leu Cys Lys Cys Gln Pro Gly Phe Thr Gly Ala Arg Cys Thr Glu Asn	727
GTG CCC ATG AAA GTC CAA ACC CAA GAA AGT GCC CAA ATG AGT TTA CTG Val Pro Met Lys Val Gln Thr Gln Glu Ser Ala Gln Met Ser Leu Leu	775
GTG ATC GCT GCC AAA ACT ACG TAATGCCAG CTTCTACAGT ACGTCCACTC Val Ile Ala Ala Lys Thr Thr	826
CCCTTCTGTC TCTGCCCTGAA TAGGCCATCT CAGTCGGTGC CGCTTCTCTTG TTGCCGCATC TCCCCTCAGA TTCCCTCCTAG AGCTAGATGC GTTTTACCAAG GTCTAACATT GACTGCCCTCT	886
GCCTGTCGCA TGAGAACATT AACACAAGCG ATTGTATGAC TTCTCTGTC CGTGACTAGT GGGCTCTGAG CTACTCGTAG GTGCCGTAAGG CTCCAGTGT TCTGAAATTG ATCTTGAATT	946
ACTGTGATACTGACATGATAG TCCCTCTCAC CCAGTGCATT GACA <u>TAAAG</u> GCCTTGAAGA GTCAAAAAAAA AAAAATCGA TGTCGACTCG AGATGTGGCT GCAGGGTCGAC	1006
TCTAGAG	1126
	1186
	1193

FIG. 28D

Nucleotide Sequences & Deduced Amino Acid Sequences of GGF2BPP3

SEQ ID NO: 135:

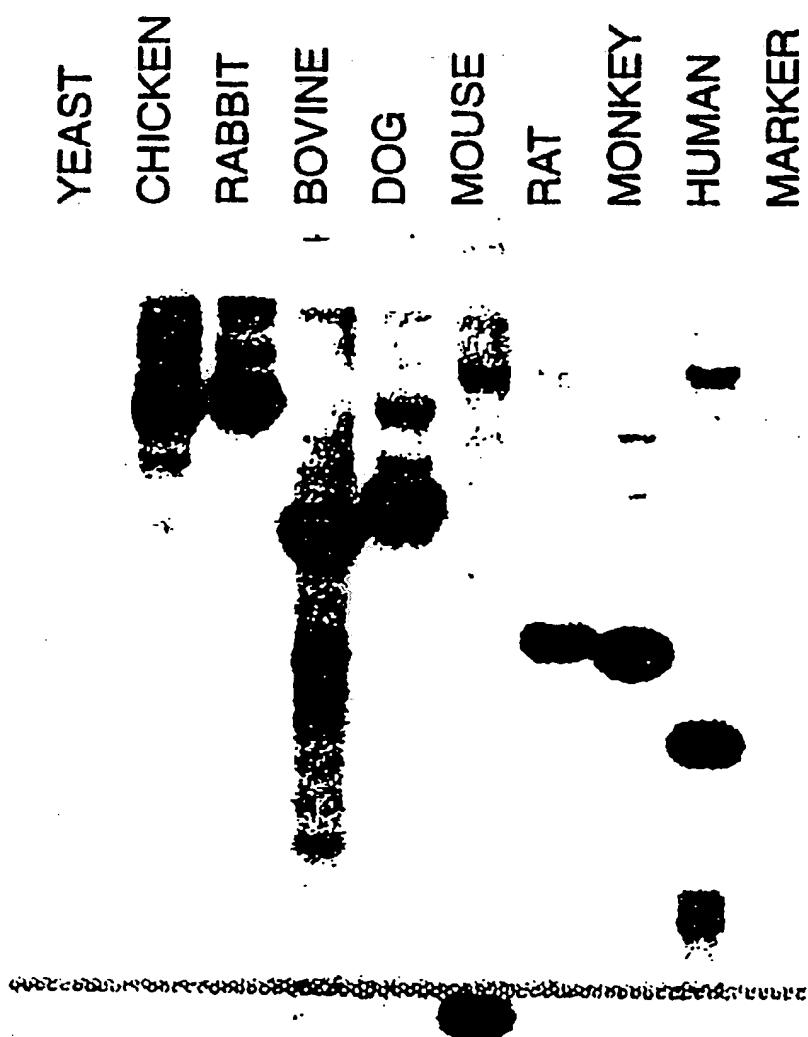
CCTGCAG CAT CAA GTG TGG GCG AAA GCC GGG GGC	TTG AAG AAG GAC TCG CTG	55
His Gln Val Trp Ala Ala Lys Ala Gly Leu Lys Asp Ser Leu		
CTC ACC GTG CGC CTG GGC CCC TGG GGC CAC CCC	TTC CCC TCC TGC	103
Leu Thr Val Arg Leu Gly Ala Trp GLY His Pro Ala Phe Pro Ser Cys		
GGG CGC CTC AAG GAG GAC AGC AGG TAC ATC TTC	ATG GAG CCC GAG	151
Gly Arg Leu Lys Glu Asp Ser Arg Tyr Ile Phe Phe Met Glu Pro Glu		
GCC AAC AGC AGC GGC GGG CCC GGC CGC CTT CCG	AGC CTC CTT CCC CCC	199
Ala Asn Ser Ser Gly Pro Gly Arg Leu Pro Ser Leu Leu Pro Pro		
TCT CGA GAC GGG CCG GAA CCT CAA GAA GGA GGT CAG	CGG GCT GCT GTG	247
Ser Arg Asp Gly Pro Glu Pro Gln Glu Gly Gly Gln Pro Gly Ala Val		
CAA CGG TGC GCC TTG CCT CCC CGC TTG AAA GAG ATG AAG AGT CAG GAG		295
Gln Arg Cys Ala Leu Pro Pro Arg Leu Lys Glu Met Lys Ser Gln Glu		
TCT GTG GCA GGT TCC AAA CTA GTG CTT CGG TGC GAG ACC AGT TCT GAA		343
Ser Val Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu		
TAC TCC TCT CTC AAG TTC AAG TGG TTC AAG AAT GGG AGT GAA TTA AGC		391
Tyr Ser Ser Leu Lys Phe Lys Trp Phe Lys Asn GLY Ser Glu Leu Ser		
CGA AAG AAC AAA CCA GAA AAC ATC AAG ATA CAG AAA AGG CCG GGG AAG		439
Arg Lys Asn Lys Pro Glu Asn Ile Lys Ile Gln Lys Arg Pro Pro Lys		
TCA GAA CTT CGC ATT AGC AAA GCG TCA CTG GCT GAT TCT GGA GAA TAT		487
Ser Glu Leu Arg Ile Ser Lys Ala Ser Lys Ala Asp Ser Gly Glu Tyr		

FIG. 28E

Nucleotide Sequences & Deduced Amino Acid Sequences of GGF2BPP3

ATG TGC AAA GTG ATC AGC AAA CTA GGA AAT GAC AGT GCC TCT GCC AAC	535
Met Cys Lys Val Ile Ser Lys Leu Glu Asn Asp Ser Ala Ser Ala Asn	
<u>Ile Arg</u> ATT GTG GAG TCA AAC GCC ACA TCC ACA TCT ACA GCT GGG ACA	583
<u>Ile Val</u> Glu Ser Asn <u>Ala</u> <u>Thr</u> Ser Thr Ser Thr Ala Gly Thr	
AGC CAT CTT GTC AAG TGT GCA GAG AAG GAG AAA ACT TTC TGT GTG AAT	631
Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn	
GGA GGC GAG TGC TTC ATG GTG AAA GAC CTT TCA AAT CCC TCA AGA TAC	679
GLY GLY Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr	
TTG TGC AAG TGC CCA AAT GAG TTT ACT GGT GAT CGC TGC CAA AAC TAC	727
Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr	
GTA ATG GCC AGC TTC TAC AGT ACG TCC ACT CCC TT ^T CTG TCT CTG CCT	775
Val Met Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu Ser Leu Pro	
GAA TAGCGCATCT CAGTCGGTGC CGCTTTCTTGT TTGCCGCATC TCCCCTCAGA TTCCGCCCTAG	838
Glu	
AGCTAGATGC GTTTTACCAAG GTCTAACATT GACTGCCCTCT GCCTGTCGCCA TGAGAACATT	898
AACACAAGGG ATTGTATGAC TTCCCTCTGTC CGTGACTAGT GGGCTCTGAG CTACTCGTAG	958
GTGGCGTAAGG CTCCAGTGT TCTGAAATT ATCTTGAATT ACTGTGATAAC GACATGATAG	1018
TCCCTCTCAC CCAGTGCATT GACAATAAAG GCCTTGAAGA GTCAAAAAAA AAAA	1078
AAAATCGAT GTCGACTCGA GATGGGGCTG	1108

FIG. 29



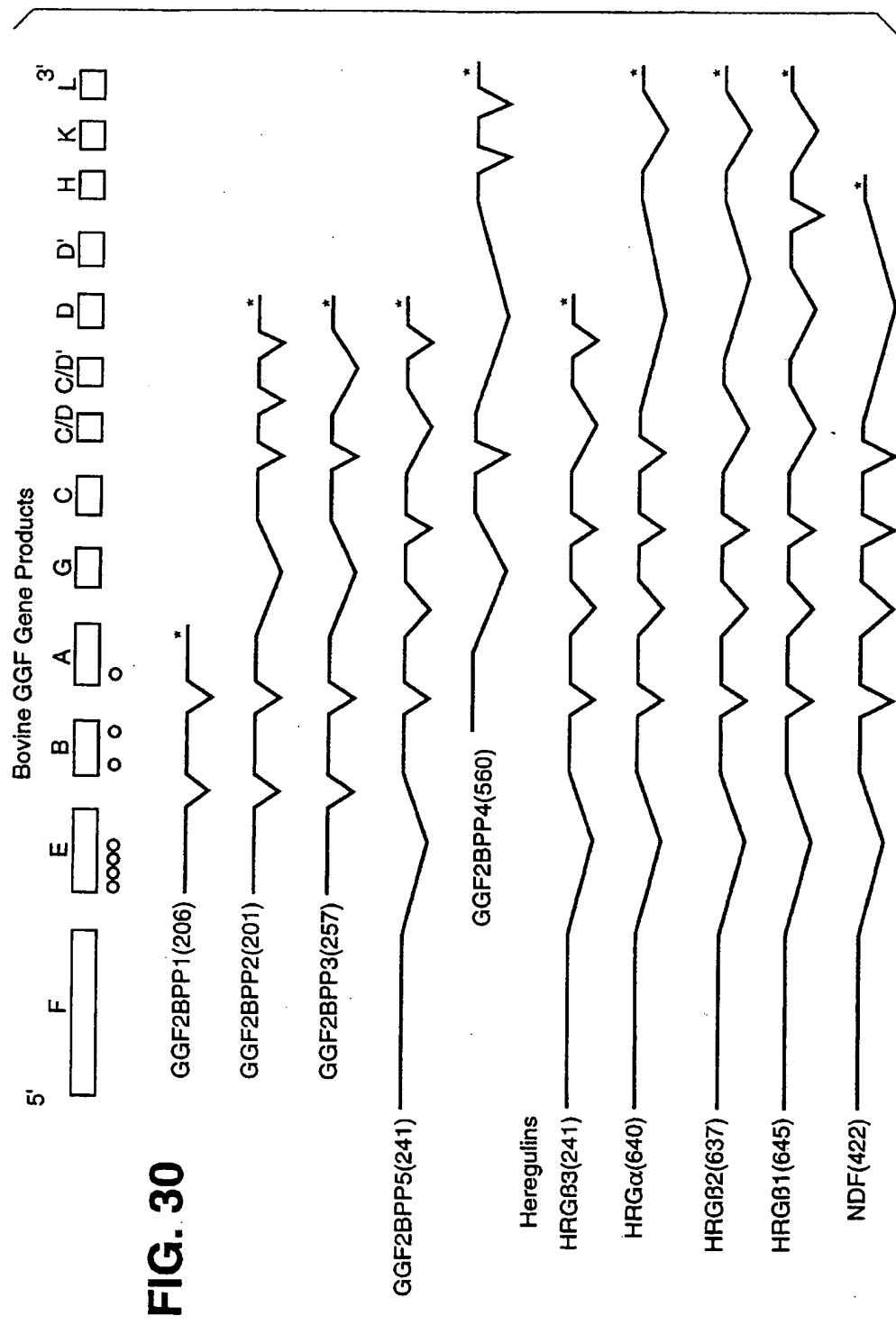


FIG. 30

FIG. 31A

CODING SEGMENT F: (SEQ ID NO: 136 (bovine) and 173 (human))

FIG. 31B

CODING SEGMENT E: (SEQ ID NO: 137)

FIG. 31C

CODING SEGMENT B: (SEQ ID NO: 138 (bovine) and 174 (human))

Leu	Pro	Pro	Arg	Leu	Lys	Glu	His	Lys	Ser	Gln	Glu	Ser	Val	Ala	Gly	48
CCT	TGC	CTC	CCC	GCT	TGA	AAG	AGA	TGA	AGA	GTC	AGG	AGT	CTG	TGG	CAG	
CCT	TGC	CTC	CCC	GAT	TGA	AAG	AGA	TGA	AGA	GCC	AGG	AAT	CGG	CTG	CAG	
Ser	Lys	Leu	Val	Leu	Arg	Cys	Glu	Thr	Ser	Glu	Tyr	Ser	Ser	Leu		96
GTT	CCA	AAC	TAG	TGC	TTC	GGT	GCG	AGA	CCA	GTT	CTG	AAT	ACT	CCT	CTC	
GTT	CCA	AAC	TAG	TCC	TTC	GGT	GTG	AAA	CCA	GTT	CTG	AAT	ACT	CCT	CTC	
Lys	Phe	Lys	Trp	Phe	Lys	Asn	Gly	Ser	Glu	Leu	Ser	Arg	Lys	Asn	Lys	144
TCA	AGT	TCA	AGT	GGT	TCA	AGA	ATG	GGA	GTG	AAT	TAA	GCC	GAA	AGA	ACA	
TCA	GAT	TCA	AGT	GGT	TCA	AGA	ATG	GGA	ATG	AAT	TGA	ATC	GAA	AAA	ACA	R
											N					
Pro	Gly	Asn	Ile	Lys	Ile	Gln	Lys	Arg	Pro	Gly						
AAC	CAC	AAA	ACA	TCA	AGA	TAC	AGA	AAA	GGC	CGG	G					
AAC	CAC	AAA	ATA	TCA	AGA	TAC	AAA	AAA	AGC	CAG	G					K

FIG. 31D

CODING SEGMENT A: (SEQ ID NO: 139 (bovine) and 175 (human))

Lys Ser Glu Leu Arg Ile Ser Lys Ala Ser Leu Ala Asp Ser Gly
G AAG TCA GAA CTT CGC ATT AGC AAA GCG TCA CTG GCT GAT TCT GGA
||| |||| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
G AAG TCA GAA CTT CGC ATT AAC AAA GCA TCA CTG GCT GAT TCT GGA
N

Glu Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser
GAA TAT ATG TGC AAA GTG ATC AGC AAA CTA GGA AAT GAC AGT GCC TCT
||| |||| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
GAG TAT ATG TGC TGC AAA GTG ATC AGC AAA TTA GGA AAT GAC AGT GCC TCT

Ala Asn Ile Thr Ile Val Glu Ser Asn Ala
GCC AAC ATC ACC ATT GTG GAG TCA AAC G
||| ||| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
GCC AAT ATC ACC ATC GTG GAA TCA AAC G

46

94

122

FIG. 31E

CODING SEGMENT A' : (SEQ ID NO: 140)

TCTAAACTA	CAGAGACTGT	ATTTCATGA	TCATCATAGT	TCTGTGAAAT	ATACTTAAC	60											
CGCTTGGTC	CTGATCTTGT	AGG	AAG	TCA	GAA	CTT	CGC	ATT	AGC	AAA	GCG	110					
Ser	Lys	Ser	Glu	Ile	Arg	Ile	Ser	Lys	Ile	Ser	Lys	Ala					
TCA	CTG	GCT	GAT	TCT	GGA	GAA	TAT	ATG	TGC	AAA	GTG	ATC	AGC	AAA	CTA	158	
Ser	Leu	Ala	Asp	Ser	Gly	Glu	Tyr	Met	Cys	Lys	Val	Ile	Ser	Lys	Leu		
GGA	AAT	GAC	AGT	GCC	TCT	GCC	AAC	ATC	ACC	ATT	GTG	GAG	TCA	AAC	GGT	206	
Gly	Asn	Asp	Ser	Ala	Ser	Ala	Asn	Ile	Asn	Ile	Thr	Ile	Val	Glu	Ser	Asn	Gly
AAG	AGA	TGC	CTA	CTG	CGT	ATT	TCT	CAG	TCT	CTA	AGA	GGA	GTG	ATC	254		
Lys	Arg	Cys	Ile	Leu	Arg	Ala	Ile	Ser	Gin	Ser	Leu	Arg	Gly	Val	Ile		
AAG	GTA	TGT	GGT	CAC	ACT	TGAATCACCGC	AGGTGTGTA	AATCTCATTTG							302		
Lys	Val	Cys	Gly	His	Thr												
TGAACAAATA	AAAATCATGA	AAGGAAAACT	CTATGTTGA	AATATCTTAT	GGGTCCCTCCT	362											
GTAAAGCTCT	TCACTCCATA	AGGTGAATA	GACCTGAAAT	ATATATAGAT	TATTT	417											

FIG. 31F

CODING SEGMENT G: (SEQ ID NO: 141 (bovine) and 176 (human))

Glu	Ile	Thr	Thr	Gly	Met	Pro	Ala	Ser	Thr	Glu	Thr	Ala	Tyr	Val	Ser
AG	ATC	ACC	ACT	GGC	ATG	CCA	GCC	TCA	ACT	GAG	ACA	GCG	TAT	GTG	TCT
AG	ATC	ATC	ACT	GGT	ATG	CCA	GCC	TCA	ACT	GAA	GGA	GCA	TAT	GTG	TCT
Ser	Glu	Ser	Pro	Ile	Arg	Ile	Ser	Val	Ser	Thr	Glu	Gly	Thr	Asn	Thr
TCA	GAG	TCT	CCC	ATT	AGA	ATA	TCA	GTA	TCA	ACA	GAA	GGA	ACA	AAT	ACT
TCA	GAG	TCT	CCC	ATT	AGA	ATA	TCA	GTA	TCC	ACA	GAA	GGA	GCA	AAT	ACT

Ser Ser Ser
TCT TCA T
||| ||| |
TCT TCA T

102

95

47

FIG. 31G

CODING SEGMENT C: (SEQ ID NO: 160 (bovine) and 177 (human))

Thr	Ser	Thr	Ser	Thr	Ala	Gly	Thr	Ser	His	Leu	Val	Lys	Cys	Ala	
CC	ACA	TCC	ACA	TCT	ACA	GCT	GGG	ACA	AGC	CAT	CTT	GTC	AAG	TGT	GCA
															47
CT	ACA	TCT	ACA	TCC	ACC	ACT	GGG	ACA	AGC	CAT	CTT	GTA	AAA	TGT	GCG
Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn	Gly	Glu	Cys	Phe	Met	Val	
GAG	AAG	GAG	AAA	ACT	TTC	TGT	GTG	AAT	GGA	GGC	GAG	TGC	TTC	ATG	GTG
															95
GAG	AAG	GAG	AAA	ACT	TTC	TGT	GTG	AAT	GGA	GGG	GAG	TGC	TTC	ATG	GTG
Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	Leu	Cys					
AAA	GAC	CTT	TCA	AAT	CCC	TCA	AGA	TAC	TTG	TGC					
															128
AAA	GAC	CTT	TCA	AAC	CCC	TCG	AGA	TAC	TTG	TGC					

FIG. 31H

CODING SEGMENT C/D: (SEQ ID NO: 142 (bovine) and 178 (human))

Lys	Cys	Gln	Pro	Gly	Phe	Thr	Gly	Ala	Arg	Cys	Thr	Glu	Asn	Val	Pro
AAG	TGC	CAA	CCT	GGA	TTC	ACT	GGA	GCG	AGA	TGT	ACT	GAG	AAT	GTG	CCC
AAG	TGC	CAA	CCT	GGA	TTC	ACT	GGA	GCA	AGA	TGT	ACT	GAG	AAT	GTG	CCC
48															
Met	Lys	Val	Gln	Thr	Gln	Glu									
ATG	AAA	GTC	CAA	ACC	CAA	GAA									
ATG	AAA	GTC	CAA	AAC	CAA	GAA									
69															
							N								

FIG. 31I

CODING SEGMENT D: (SEQ ID NO: 143 (bovine) and 179 (human))

lys	cys	pro	asn	glu	phe	thr	gly	asp	arg	cys	gln	asn	tyr	val	met
AAG	TGC	CCA	AAT	GAG	TTC	ACT	GGT	GAT	CGC	TGC	CAA	AAC	TAC	GTA	ATG
AAG	TGC	CCA	AAT	GAG	TTC	ACT	GGT	GAT	CGC	TGC	CAA	AAC	TAC	GTA	ATG

ala	ser	phe	tyr
GCC	AGC	TTC	TAC
GCC	AGC	TTC	TAC

60

FIG. 31J

CODING SEGMENT D: (SEQ ID NO: 144 (bovine) and 180 (human))

Ser	Thr	Ser	Thr	Pro	Phe	Leu	Ser	Leu	Pro	Glu	*
AGT	ACG	TCC	ACT	CCC	TTC	CTG	TCT	CTG	CCT	GAA	TAG
AGT	ACG	TCC	ACT	CCC	TTC	CTG	TCT	CTG	CCT	GAA	TAG

36

FIG. 31K

CODING SEGMENT D': (SEQ ID NO: 145 (bovine))

lys	his	leu	gly	ile	glu	phe	met	glu
AAG	CAT	CTT	GGG	ATT	GAA	TTT	ATG	GAG

27

FIG. 31L

CODING SEGMENT H: (SEQ ID NO: 146 (bovine) and 181 (human))

Lys	Ala	Glu	Glu	Leu	Tyr	Gln	Lys	Arg	Val	Leu	Thr	Ile	Thr	Gly	Ile
AAA	GCG	GAG	GAG	CTC	TAC	CAG	AAG	AGA	GTG	CTC	ACC	ATT	ACC	GCC	ATT
AAG	GCG	GAG	GAG	CTG	TAC	CAG	AAG	AGA	GTG	CTG	ACC	ATA	ACC	GGC	ATC
Cys	Ile	Ala	Leu	Leu	Val	Val	Gly	Ile	Met	Cys	Val	Val	Tyr	Tyr	Cys
TGC	ATC	GCG	CTG	CTC	GTT	GTC	GTC	ATC	ATG	TGT	GTG	GTC	TAC	TGC	
TGC	ATC	GCC	CTC	CTT	GTG	GTC	GGC	ATC	ATG	TGT	GTG	GTC	TAC	TGC	A
Lys	Thr	Lys	Lys	Gln	Arg	Lys	Lys	Leu	Asp	Arg	Leu	Arg	Gln	Ser	
AAA	ACC	AAG	AAA	CAA	CGG	AAA	AAG	CAT	GAC	CGG	CAT	CGG	CAG	AGC	
AAA	ACC	AAG	AAA	CAG	CGG	AAA	AAG	CTG	CAT	GAC	CGT	CTT	CGG	CAG	AGC
Leu	Arg	Ser	Glu	Arg	Asn	Thr	Met	Met	Asn	Val	Ala	Asn	Gly	Pro	His
CTT	CGG	TCT	GAA	AGA	AAC	ACC	ATG	ATG	AAC	GTA	GCC	AAC	GGG	CCC	CAC
CTT	CGG	TCT	GAA	CGA	AAC	AAT	ATG	ATG	AAC	ATT	GCC	AAT	GGG	CCT	CAC
His	Pro	Asn	Pro	Pro	Glu	Asn	Val	Gln	Leu	Val	Asn	Gln	Tyr	Val	
CAC	CCC	AAT	CCG	CCC	CCC	GAG	AAC	GTG	CAG	CTG	GTG	AAT	CAA	TAC	GTA
CAT	CCT	AAC	CCA	CCC	CCC	GAG	AAT	GTC	CAG	CTG	GTG	AAT	CAA	TAC	GTA
Ser	Lys	Asn	Val	Ile	Ser	Ser	Glu	Ile	Val	Glu	Arg	Glu	Ala	Glu	
TCT	AAA	AAT	GTC	ATC	TCT	AGC	GAG	CAT	ATT	GTT	GAG	AGA	GAG	GCG	GAG
TCT	AAA	AAC	GTC	ATC	TCC	AGT	GAG	CAT	ATT	GTT	GAG	AGA	GAA	GCA	GAG

48
96
144
192
240
288

FIG. 31M

Ser	Ser	Phe	Ser	Thr	Ser	His	Tyr	Thr	Ser	Thr	Ala	His	Ser	Thr	
AGC	TCT	TTT	TCC	ACC	AGT	CAC	TAC	ACT	TCG	ACA	GCT	CAT	CAT	TCC	ACT
ACA	TCC	TTT	TCC	ACC	AGT	CAC	TAT	ACT	TCC	ACA	GCC	CAT	CAC	TCC	ACT
T															
Thr	Val	Thr	Gln	Thr	Pro	Ser	His	Ser	Trp	Ser	Asn	Gly	His	Thr	Glu
ACT	GTC	ACT	CAG	ACT	CCC	AGT	CAC	AGC	TGG	AGC	AAT	GGA	CAC	ACT	GAA
ACT	GTC	ACC	CAG	ACT	CCT	AGC	CAC	AGC	TGG	AGC	AAC	GGA	CAC	ACT	GAA
L															
Ser	Ile	Ile	Ser	Glu	Ser	His	Ser	Val	Ile	Val	Met	Ser	Ser	Val	Glu
AGC	ATC	ATT	TCG	GAA	AGC	CAC	TCT	GTC	ATC	GTC	ATG	TCA	TCC	GTA	GAA
AGC	ATC	CTT	TCC	GAA	AGC	CAC	TCT	GTA	ATC	GTG	ATG	TCA	TCC	GTA	GAA
T															
Asn	Ser	Arg	His	Ser	Ser	Pro	Thr	Gly	Gly	Pro	Arg	Gly	Arg	Leu	Asn
AAC	AGT	AGG	CAC	AGC	AGC	CCG	ACT	GGG	GGC	CCG	AGA	GGA	CGT	CRC	AAT
AAC	AGT	AGG	CAC	AGC	AGC	CCA	ACT	GGG	GGC	CCA	AGA	GGA	CGT	CTT	AAT
T															
Gly	Leu	Gly	Gly	Pro	Arg	Glu	Cys	Asn	Ser	Phe	Leu	Arg	His	Ala	Arg
GGC	TTG	GGG	CCT	CGT	GAA	TGT	AAC	AGC	TTC	CTC	AGG	CAT	GCC	AGA	
GGC	ACA	GGA	GGC	CCT	CGT	GAA	TGT	AAC	AGC	TTC	CTC	AGG	CAT	GCC	AGA
T															
Glu	Thr	Pro	Asp	Ser	Tyr	Arg	Asp	Ser	Pro	His	Ser	Glu	Arg		
GAA	ACC	CCT	GAC	TCC	TAC	CGA	GAC	TCT	CCT	CAT	AGT	GAA	AG		
GAA	ACC	CCT	GAT	TCC	TAC	CGA	GAC	TCT	CCT	CAT	AGT	GAA	AG		

FIG. 31N

CODING SEGMENT K: (SEQ ID NO: 161)

A	CAT	AAC	CTT	ATA	GCT	GAG	CTA	AGG	AAC	AAG	GCC	CAC	AGA	TCC
His	Asn	Leu	Ile	Ala	Glu	Leu	Arg	Arg	Asn	Lys	Ala	His	Arg	Ser
AAA	TGC	ATG	CAG	ATC	CAG	CTT	TCC	GCA	ACT	CAT	CTT	AGA	GCT	TCC
Lys	Cys	Met	Gln	Ile	Gln	Leu	Ser	Ala	Thr	His	Leu	Arg	Ala	Ser
ATT	CCC	CAT	TGG	GCT	TCA	TTC	TCT	AAG	ACC	CCT	TGG	CCT	TTA	GGA
Ile	Pro	His	Trp	Ala	Ser	Phe	Ser	Lys	Thr	Pro	Trp	Pro	Leu	Gly
														Arg

46

94

141

CODING SEGMENT L: (SEQ ID NO: 147 (bovine) and 182 (human))

FIG. 310

Tyr	Val	Ser	Ala	Met	Thr	Thr	Pro	Ala	Arg	Met	Ser	Pro	Val	Asp	
G	TAT	GTA	TCA	GCA	ATG	ACC	ACC	GCT	CGT	ATG	TCA	CCT	GTA	GAT	
G	TAT	GTG	TCA	GCC	ATG	ACC	ACC	GCT	CGT	CGT	ATG	TCA	CCT	GTA	GAT
Phe	His	Thr	Pro	Ser	Ser	Pro	Lys	Ser	Pro	Pro	Ser	Glu	Met	Ser	Pro
TTC	CAC	ACG	CCA	AGC	TCC	CCC	AAG	TCA	CCC	CCT	TGG	GAA	ATG	TCC	CCG
TTC	CAC	ACG	CCA	AGC	TCC	CCC	AAA	TGG	CCC	CCT	TGG	GAA	ATG	TCT	CCA
Pro	Val	Ser	Ser	Thr	Thr	Val	Ser	Met	Pro	Ser	Met	Ala	Val	Ser	Pro
CCC	GTG	TCC	AGC	ACG	GTC	TCC	ATG	CCC	TCC	ATG	GCG	GTC	ACT	CCC	142
CCC	GTG	TCC	AGC	ATG	ACG	GTG	TCC	ATG	CCT	TCC	ATG	GCG	GTC	AGC	CCC
Phe	Val	Glu	Glu	Glu	Arg	Pro	Leu	Leu	Val	Thr	Pro	Pro	Arg	Leu	
TTC	GTG	GAA	GAG	GAG	AGA	CCC	CTG	CTG	CTG	GTG	ACG	CCA	CGG	CTG	
TTC	ATG	GAA	GAA	GAG	AGA	CCT	CTA	CTT	CTC	GTG	ACA	CCA	AGG	CTG	N
Arg	Glu	Lys	-	Tyr	Asp	His	Ala	Gln	Gln	Phe	Asn	Ser	Phe	His	
CGG	GAG	AAG	...	TAT	GAC	CAC	GAC	GCC	CAG	CAA	TTC	AAC	TGG	TTC	238
CGG	GAG	AAG	AAG	TTT	GAC	CAT	CAC	CCT	CAG	CAG	TTC	AGC	TCC	TTC	CAC
Cys	Asn	Pro	Ala	His	Glu	Ser	Asn	Ser	Leu	Pro	Ser	Pro	Leu	Arg	
TGC	AAC	CCC	GCG	CAT	GAG	AGC	AAC	AGC	CTG	CCC	CCC	AGC	CCC	TTG	AGG
CAC	AAC	CCC	GCG	CAT	GAC	AGT	AAC	AGC	CTC	CCT	GCT	AGC	CCC	TTG	AGG

FIG. 31P

Ile	Val	Glu	Asp	Glu	Glu	Tyr	Glu	Thr	Glu	Gln	Glu	Tyr	Glu	Pro	Ala
ATA	GTC	GAG	GAT	GAG	GAA	TAT	GAA	ACG	ACC	CAG	GAG	TAC	GAA	CCA	GCT
ATA	GTC	GAG	GAT	GAG	GAG	TAT	GAA	ACG	ACC	CAA	GAG	TAC	GAG	CCA	GCC
Gln	Glu	Glu	Pro	Val	Lys	Lys	Leu	Thr	Asn	Ser	Ser	Arg	Arg	Ala	Lys
CAA	GAG	CCG	GTT	AAG	AAA	CTC	ACC	AAC	AGC	AGC	CGG	CGG	GCC	AAA	AGA
CAA	GAG	CCT	GTT	AAG	AAA	CTC	GCC	AA.	..T	AGC	CGG	CGG	GCC	AAA	AGA
Thr	Lys	Pro	Asn	Gly	His	Ile	Ala	His	Arg	Leu	Glu	Met	Asp	Asn	Asn
ACC	AAG	CCC	AAT	GGT	CAC	ATT	GCC	CAC	AGG	TTG	GAA	ATG	GAC	AAC	AAC
ACC	AAG	CCC	AAT	GGC	CAC	ATT	GCT	AAC	AGA	TTG	GAA	GTG	GAC	AGC	AAC
Thr	Gly	Ala	Asp	Ser	Ser	Asn	Ser	Glu	Ser	Glu	Thr	Glu	Asp	Glu	Arg
ACA	GGC	GCT	GAC	AGC	AGT	AAC	TCA	GAG	AGC	GAA	ACA	GAG	GAT	GAA	AGA
ACA	AGC	TCC	CAG	AGC	AGT	AAC	TCA	GAG	AGT	GAA	ACA	GAA	GAT	GAA	AGA
S										N	V	S			

FIG. 31Q

FIG. 31R

HUMAN CODING SEGMENT E:
(SEQ ID NO: 163)

ATG	AGA	TGG	CGA	CGC	GCC	CCG	CGC	TCC	GGG	CGT	CCC	GAC	CCC	CGG	Arg	Arg	Ser	Gly	Arg	Pro	Gly	Pro	Arg			
Met	Arg	Trp	Arg	Arg	Ala	Pro	Arg	Arg	Arg	Cys	CCG	CCG	CCG	CCG	CCG	CTG										
GCC	CAG	CGC	CCC	GGC	TCC	GCC	CGC	TCG																		
Ala	Gln	Arg	Pro	Gly	Ser	Ala	Ala	Arg	Ser	Ser	Pro	Pro	Pro	Pro	Pro	Leu										
CTG	CCA	CTA	CTG	CTG	CTG	CTG	CTG	GGG	ACC	GCG	CTG	GCG														
Leu	Pro	Leu	Leu	Leu	Leu	Leu	Leu	Gly	Thr	Ala																
GCG	GGC	AAC	GAG	GCG	GCT	CCC	GCG	GGG	GCC	TCC	GTC	TAC														
Ala	Ala	Gly	Asn	Glu	Ala	Ala	Pro	Ala	Gly	Ala	Ser	Tyr	Ser	Val	Cys	Tyr	Ser	Val	Cys	Tyr	Ser	Val	Cys	Tyr	Ser	
TCG	CCC	AGC	GTC	GGA	TGG	GTC	GAG	CAG	GAG	CTA	GCT	CAG	GCG	GCC	GCG	CTG	CAG	GCG	GCC	GCG	CTG	CAG	GCG	GCC	GCG	
Ser	Pro	Pro	Ser	Val	Gly	Ser	Val	Gly	Ser	Val	Gly	Leu	Ala													
GTC	GTC	ATC	GAG	GGA	AAG	GTC	CAC	CCG	CAG	CGG	CAG															
Val	Ile	Glu	Gly	Lys	Val	His	Val	His	Pro	Gly	Ala	Arg	Arg	Arg	Arg	Gly	Ala	Arg	Arg	Gly	Ala	Arg	Arg	Gly	Ala	
CTC	GAC	AGG	AAG	GCG	GAG	GCA	GGG	GCG	TGG																	
Leu	Asp	Arg	Lys	Ala	Gly	Glu	Ala																			
GCG	GAT	CGC	GAG	GCG	CCA	GCC	GCG	GCG	GCG	GCG	GCA	CCG	GCG	CTG	GGG	CCG	CCC	CTG	GGG	CCG	CCC	CTG	GGG	CCG	CCC	CTG
Gly	Asp	Arg	Glu	Pro	Pro	Pro	Ala	Ala	Ala	Ala	Gly	Pro	Arg	Ala	Leu	Gly	Pro	Arg	Ala	Leu	Gly	Pro	Arg	Ala	Leu	Gly
GCC	GAC	GAG	CCG	CTG	CTC	GCC	GCC	AAC	GCG	ACC	GTC	TCT	TCT	TCT	TGG											
Ala	Glu	Glu	Pro	Leu	Leu	Ala	Ala	Asn	Gly	Thr	Val	Val	Pro	Pro	Ser	Trp	Pro	Pro	Val	Pro	Pro	Val	Pro	Pro	Val	Pro
ACC	GCC	CCC	GTC	CCC	AGC	GCC	GGC	GAG	CCC	GGG	GAG															
Thr	Ala	Pro	Val	Pro	Ser	Ala	Gly	Glu	Pro	Gly																
CTG	GTC	AAG	GTC	CAC	CAG	GTC	TGG	GCG	GTC	AAA	GCC	GGG	GGG	GGG	GGG	GGC	TTG	AAG	GGG	GGG	GGC	TTG	AAG	GGG	GGC	
Leu	Val	Lys	Val	His	Gln	Val	Trp	Ala	Val	Lys	Ala	Gly	Gly	Gly	Gly	Gly	Leu	Lys	Ala	Gly	Gly	Leu	Lys	Ala	Gly	
AGG	GAC	TCG	CTC	ACC	GTC	GGC	CTG	GGG	ACC	GGC	CTG	GGG	ACC	GGC	CTG	GGC	CCC	TAT	GGG	GGG	GGC	CCC	TAT	GGG	GGC	CCC
Lys	Asp	Ser	Leu	Leu	Thr	Val	Arg	Leu	Gly	Thr	Val	Arg	Leu	Gly	Thr	Val	Gly	His	Pro	Ala	Pro	Ala	Pro	Ala	Pro	Ala
TTC	CCC	TCC	TGC	GGG	AGG	CTC	AAG	GAG	GAC	AGC	AGG	TAC	ATC	TTC												
Phe	Pro	Ser	Cys	Gly	Arg	Ile	Lys	Glu	Asp	Ser	Arg	Tyr														
ATG	GAG	CCC	GAC	GCC	AAC	AGC	ACC	AGC	GGC																	
Met	Glu	Pro	Asp	Ala	Asn	Ser	Thr	Ser	Arg	Ala	Pro	Ala	Ala	Pro	Ala											
GCC	TCT	TTC	CCC	CCT	CTG	GAG	ACG	GGC	GGG																	
Ala	Ser	Phe	Pro	Pro	Leu	Glu	Thr	Gly	Arg	Asn	Leu	Lys														
AGC	CGG	GTC	CTG	TGC	AAG	GGG	TGC	G	Ser	Arg	Val	Ile	Cys	Lys	Arg	Cys	Ser	Arg	Val	Ile	Cys	Lys	Arg	Cys	Ser	

FIG. 32A

GGF2BPP5 Nucleotide Sequence & Deduced Protein Sequence

SEQ ID NO: 148:

AGTTTCCCCC	CCCAAACTTGT	CGGAACCTGT	GGCTCGGGG	CAGGGAGGA	GCGGAGGGC	60
GGGGGCTGCC	CAGGGATGCC	GAGGCGGGC	CGGACGGTAA	TGCCCCTCTC	CTCCCTCGGC	120
TGGGAGCGCG	CCGGACCGAG	GCAGCGACAG	GAGCGGACCG	CGGGGGAAC	CGAGGACTCC	180
CCAGGGCGC	GCCAGCAGGA	GCCACCCCGC	GAGCGTGGCA	CGGGGACGGA	GCGCCCGCCA	240
GTCAGGGTGT	GCCCCGACCG	CACTTGCCT	CCCCGGCTC	CCGGCGGGG	ACAGGGAGACG	300
CTCCCCCCA	CGCCGGCGC	GCCTCGGCC	GGTCGCTGGC	CGGCCTCCAC	TCCGGGACA	360
AACTTTTCCC	GAAGCCGATC	CCAGCCCTCG	GACCCAAACT	TGTCGGCGGT	CGCCCTTCGCC	420
GGGAGCCGTC	CGGCCAGAGC	GTGCACTTCT	CGGGGAG	ATG TCG GAG CGC AGA	Met Ser Glu Arg Arg	475
GAA GGC AAA GGC AAG GGG AAG GGC	GGC AAG GAC CGA CGA CGC TCC	GGC	523	Glu Gly Lys Gly Lys Gly Lys Asp Arg Gly Ser Gly		
AAG AAG CCC GTG CCC GCG GCT GGC	GGC CCG AGC CCA GCC TTG CCT CCC		571	Lys Pro Val Pro Ala Ala Gly Pro Ser Pro Ala Leu Pro		
Arg Leu Lys Glu Met Lys Ser Gln	GAG ATG AAG ATG CAG GAG TCT GTG GGT TCC AAA CTA		619	Arg Lys Gly Ser Val Ala Gly Ser Lys Leu		
GTG CTT CGG TGC GAG ACC AGT TCT GAA TAC TCC	TCT CTC AAG TTC AAG		667	Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Lys Phe Lys		
TGG TTC AAG AAT GGG AGT GAA TTA AGC CGA AAG AAC AAA CCA CAA AAC			715	Trp Phe Lys Asn Gly Ser Glu Leu Ser Arg Lys Asn Lys Pro Gln Asn		
ATC AAG ATA CAG AAA AGG CCG GGG AAG TCA GAA CTG CGC ATT AGC AAA			763	Ile Lys Ile Gln Lys Arg Pro Gly Lys Ser Glu Leu Arg Ile Ser Lys		
GCG TCA CTG GCT GAT TCT GGA GAA TAT ATG TGC AAA GTG ATC AGC AAA			811	Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser Lys		

FIG. 32B

GGF2BPP5 Nucleotide Sequence & Deduced Protein Sequence

FIG. 33A

GCF2BPP2 Nucleotide Sequence & Deduced Protein Sequence

SEQ ID NO: 149:

CAT	CAN	GTG	TGG	GCG	GCG	AAA	GCC	GGG	GGC	TTG	AAG	AAG	GAC	TCG	CTG	48
His	Gln	Vai	Trp	Ala	Ala	Lys	Ala	Gly	Gly	Leu	Lys	Asp	Ser	Leu		
CTC	ACC	GTG	CGC	CTG	GGC	GCC	TGG	GGC	CAC	CCC	GCC	TTC	CCC	TCC	TGC	96
Leu	Thr	Vai	Arg	Leu	Gly	Ala	Trp	Gly	His	Pro	Ala	Phe	Pro	Ser	Cys	
GGG	CGC	CTC	AAG	GAG	GAC	AGC	TAC	ATC	TTC	TTC	ATG	GAG	CCC	GAG		144
Gly	Arg	Leu	Lys	Glu	Asp	Ser	Arg	Tyr	Ile	Phe	Phe	Met	Glu	Pro	Glu	
GCC	AAC	AGC	AGC	GGC	GGC	CCC	GGC	CGC	CTT	CCG	AGC	CTC	CTT	CCC	CCC	192
Ala	Asn	Ser	Ser	Gly	Gly	Pro	Gly	Arg	Leu	Pro	Ser	Leu	Leu	Pro	Pro	
TCT	CGA	GAC	GGG	CGG	GAA	CCT	CAA	GAA	GGA	GGT	CAG	CCG	GGT	GCT	GTT	240
Ser	Arg	Asp	Gly	Pro	Glu	Pro	Gln	Glu	Gly	Gly	Gln	Pro	Gly	Ala	Val	
CAA	CGG	TGC	GCC	TTG	CCT	CCC	CGC	TTG	AAA	GAG	ATG	AAG	AGT	CAG	GAG	288
Gln	Arg	Cys	Ala	Leu	Pro	Pro	Arg	Leu	lys	Glu	Met	Lys	Ser	Gln	Glu	
TCT	GTG	GCA	GGT	TCC	AAA	CTA	GTG	CTT	CGG	TGC	GAG	ACC	AGT	TCT	GAA	336
Ser	Vai	Ala	Gly	Ser	Lys	Leu	Vai	Leu	Arg	Cys	Glu	Thr	Ser	Ser	Glu	
TAC	TCC	TCT	AAG	TTC	AAG	TGG	TTC	AAG	AAT	GGG	AGT	GAA	TTA	AGC		384
Tyr	Ser	Ser	Leu	Lys	Phe	Lys	Trp	Phe	Lys	Asn	Gly	Ser	Glu	Leu	Ser	
CGA	AAG	AAC	AAA	CCA	GAA	AAC	ATC	AAG	ATA	CAG	AAA	AGG	CCG	GGG	AAG	432
Arg	Lys	Asn	Lys	Pro	Glu	Asn	Ile	Lys	Ile	Gln	Lys	Arg	Pro	Gly	Lys	
TCA	GAA	CTT	CGC	ATT	AGC	AAA	GCG	TCA	CTG	GCT	GAT	TCT	GGA	GAA	TAT	480
Ser	Glu	Ile	Leu	Arg	Ile	Ser	Lys	Ala	Ser	Leu	Ala	Asp	Ser	Gly	Glu	
ARG	TGC	AAA	GTC	ATC	AGC	AAA	CTA	GGA	AAT	GAC	AGT	GCC	TCT	GCC	AAC	528
Met	Cys	Lys	Val	Ile	Ser	Lys	Lys	Leu	Gly	Asn	Ser	Ala	Ser	Ala	Asn	

FIG. 3B

GGF2BPP2 Nucleotide Sequence & Deduced Protein Sequence

FIG. 34A

GGF2BPP4 Nucleotide Sequence & Deduced Protein Sequence

SEQ ID NO: 150:

G AAG TCA GAA CTT CGC ATT AGC AAA GCG TCA CTG GAT TCT GGA GAA	49
Lys Ser Glu Leu Arg Ile Ser Lys Ala Ser Leu Ala Asp Ser Gly Glu	
TAT ATG TGC AAA GTG ATC AGC AAA CTA GGA AAT GAC AGT GCC TCT GCC	
Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala	97
AAC ATC ACC ATT GTG GAG TCA AAC GCC ACA TCC ACA TCT ACA GCT GGG	
Asn Ile Thr Ile Val Glu Ser Asn Ala Thr Ser Thr Ser Thr Ala Gly	145
ACA AGC CAT CTT GTC AAG TGT GCA GAG AAG GAG AAA ACT TTC TGT GTG	
Thr Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val	193
AAT GGA GGC GAC TGC TTC ATG GTG AAA GAC CTT TCA AAT CCC TCA AGA	
Asn Gly Gly Asp Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg	241
TAC TTG TGC AAG TGC CAA CCT GGA TTC ACT GGA GCG AGA TGT ACT GAG	
Tyr Leu Cys Lys Cys Gln Pro Gly Phe Thr Gly Ala Arg Cys Thr Glu	289
AAT GTG CCC ATG AAA GTC CAA ACC CAA GAA AAA GCG GAG GAG CTC TAC	
Asn Val Pro Met Lys Val Gln Thr Gln Glu Lys Ala Glu Glu Leu Tyr	337
CAG AAG AGA GTC CTC ACC ATT ACC GGC ATT TGC ATC GCG CTG CTC GTG	
Gln Lys Arg Val Leu Thr Ile Thr Gly Ile Cys Ile Ala Leu Leu Val	385
GTT GGCG ATC ATG TGT GTG GTG GTC TAC TGC AAA ACC AAG AAA CAA CGG	
Val Gly Ile Met Cys Val Val Tyr Cys Lys Thr Lys Lys Gln Arg	433
AAA AAG CTT CAT GAC CGG CTT CGG CAG ACC CTT CGG TCT GAA AGA AAC	
Lys Lys Leu His Asp Arg Leu Arg Gln Ser Leu Arg Ser Glu Arg Asn	481
ACC ATG ATG AAC GTA GCC AAC GGG CCC CAC CAC CCC AAT CCG CCC CCC	
Thr Met Met Asn Val Ala Asn GLY Pro His His Pro Asn Pro Pro Pro	529
GAG AAC GTG CAG CTG GTG AAT CAA TAC GTA TCT AAA AAT GTC ATC TCT	
Glu Asn Val Gln Leu Val Asn Gln Tyr Val Ser Lys Asn Val Ile Ser	577

FIG. 34B

GGF2BPP4 Nucleotide Sequence & Deduced Protein Sequence

AGC GAG CAT ATT GTT GAG AGA GAG GCG GAG AGC TCT TTT TCC ACC AGT	625
Ser Glu His Ile Val Glu Arg Glu Ala Glu Ser Ser Phe Ser Thr Ser	
CAC TAC ACT TCG ACA GCT CAT CAT TCC ACT ACT GTC ACT CAG ACT CCC	673
His Tyr Thr Ser Thr Ala His His Ser Thr Val Thr Gln Thr Pro	
AGT CAC AGC TGG AGC AAT GGA CAC ACT GAA AGC ATC ATT TCG GAA AGC	721
Ser His Ser Trp Ser Asn Gly His Thr Glu Ser Ile Ile Ser Glu Ser	
CAC TCT GTC ATC GTG ATG TCA TCC GTA GAA AAC AGT AGG CAC AGC AGC	769
His Ser Val Ile Val Met Ser Ser Val Glu Asn Ser Arg His Ser Ser	
CCG ACT GGG CCG AGA GGA CGT CTC AAT GGC TTG GGA GGC CCT CGT	817
Pro Thr Gly Pro Arg Gly Arg Leu Asn Gly Leu Gly Gly Pro Arg	
GAA TGT AAC AGC TTC CTC AGG CAT GCC AGA GAA ACC CCT GAC TCC TAC	865
Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr	
CGA GAC TCT CCT CAT AGT GAA AGA CAT AAC CTT ATA GCT GAG CTA AGG	913
Arg Asp Ser Pro His Ser Glu Arg His Asn Leu Ile Ala Glu Leu Arg	
AGA AAC AAG GCC CAC AGA TCC AAA TGC ATG CAG ATC CAG CTT TCC GCA	961
Arg Asn Lys Ala His Arg Ser Lys Cys Met Gln Ile Gln Leu Ser Ala	
ACT CAT CTT AGA GCT TCT TCC ATT CCC CAT TGG GCT TCA TTC TCT AAG	1009
Thr His Leu Arg Ala Ser Ser Ile Pro His Trp Ala Ser Phe Ser Lys	
ACC CCT TGG CCT TTA GGA AGG TAT GTA TCA GCA ATG ACC CCG GCT	1057
Thr Pro Trp Pro Leu Gly Arg Tyr Val Ser Ala Met Thr Thr Pro Ala	
CGT ATG TCA CCT GTA GAT TTC CAC ACG CCA AGC TCC CCC AAG TCA CCC	1105
Arg Met Ser Pro Val Asp Phe His Thr Pro Ser Ser Pro Lys Ser Pro	
CCT TCG GAA ATG TCC CCG CCC GTG TCC AGC ACG GTC TCC ATG CCC	1153
Pro Ser Glu Met Ser Pro Pro Val Ser Ser Thr Thr Val Ser Met Pro	

FIG. 34C

GGF2BPP4 Nucleotide Sequence & Deduced Protein Sequence

FIG. 35

* * * * *

GGF2bpp5	(SEQ ID NO: 151)	KCAEKEKTFCVNGGECFMVKDLSNPSRYLCKCPNEFTGDRCQNYVMASFY
GGF2bpp4	(SEQ ID NO: 152)	KCAEKEKTFCVNGGDCFMVKDLSNPSRYLCKCQPGFTGARCTENVPMRKVQ
hEGF	(SEQ ID NO: 153)	ECLRKYKDFCIH-GECKYVKELRAPS---CKCQQEYFFGERCGEKSNKTHS

FIG. 36
**200 kDa Tyrosine Phosphorylation
Compared with Mitogenic Activity**

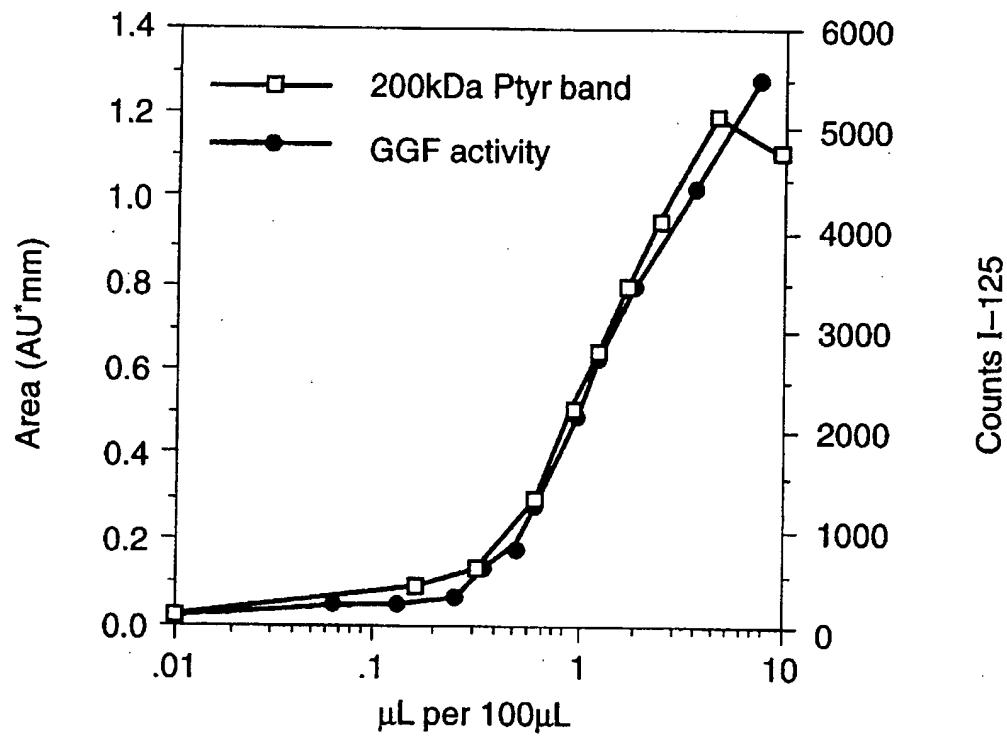


FIG. 37A GGF/Heregulin Splicing Variants

F-B-A'

F-B-A-C-C/D-D
 F-B-A-C-C/D-H
 F-B-A-C-C/D-H-L
 F-B-A-C-C/D-H-K-L
 F-B-A-C-C/D-D'-H
 F-B-A-C-C/D-D'-H-L
 F-B-A-C-C/D-D'-H-K-L
 F-B-A-C-C/D'-D
 F-B-A-C-C/D'-H
 F-B-A-C-C/D'-H-L
 F-B-A-C-C/D'-H-K-L
 F-B-A-C-C/D'-D'-H
 F-B-A-C-C/D'-D'-H-L
 F-B-A-C-C/D'-D'-H-K-L
 F-B-A-C-C/D-C/D'-D
 F-B-A-C-C/D-C/D'-H
 F-B-A-C-C/D-C/D'-H-L
 F-B-A-C-C/D-C/D'-H-K-L
 F-B-A-C-C/D-C/D'-D'-H
 F-B-A-C-C/D-C/D'-D'-H-L
 F-B-A-C-C/D-C/D'-D'-H-K-L
 F-B-A-C-C/D-C/D'-D'-H-L
 F-B-A-C-C/D-C/D'-D'-H-K-L

F-B-A-G-C-C/D-D
 F-B-A-G-C-C/D-H
 F-B-A-G-C-C/D-H-L
 F-B-A-G-C-C/D-H-K-L
 F-B-A-G-C-C/D-D'-H
 F-B-A-G-C-C/D-D'-H-L
 F-B-A-G-C-C/D-D'-H-K-L
 F-B-A-G-C-C/D'-D
 F-B-A-G-C-C/D'-H
 F-B-A-G-C-C/D'-H-L
 F-B-A-G-C-C/D'-H-K-L
 F-B-A-G-C-C/D'-D'-H
 F-B-A-G-C-C/D'-D'-H-L
 F-B-A-G-C-C/D'-D'-H-K-L
 F-B-A-G-C-C/D-C/D'-D
 F-B-A-G-C-C/D-C/D'-H
 F-B-A-G-C-C/D-C/D'-H-L
 F-B-A-G-C-C/D-C/D'-H-K-L
 F-B-A-G-C-C/D-C/D'-D'-H
 F-B-A-G-C-C/D-C/D'-D'-H-L
 F-B-A-G-C-C/D-C/D'-D'-H-K-L
 F-B-A-G-C-C/D-C/D'-D'-H-L
 F-B-A-G-C-C/D-C/D'-D'-H-K-L

F-E-B-A'

F-E-B-A-C-C/D-D
 F-E-B-A-C-C/D-H
 F-E-B-A-C-C/D-H-L
 F-E-B-A-C-C/D-H-K-L
 F-E-B-A-C-C/D-D'-H
 F-E-B-A-C-C/D-D'-H-L
 F-E-B-A-C-C/D-D'-H-K-L
 F-E-B-A-C-C/D'-D
 F-E-B-A-C-C/D'-H
 F-E-B-A-C-C/D'-H-L
 F-E-B-A-C-C/D'-H-K-L
 F-E-B-A-C-C/D'-D'-H
 F-E-B-A-C-C/D'-D'-H-L
 F-E-B-A-C-C/D'-D'-H-K-L
 F-E-B-A-C-C/D-C/D'-D
 F-E-B-A-C-C/D-C/D'-H
 F-E-B-A-C-C/D-C/D'-H-L
 F-E-B-A-C-C/D-C/D'-H-K-L
 F-E-B-A-C-C/D-C/D'-D'-H
 F-E-B-A-C-C/D-C/D'-D'-H-L
 F-E-B-A-C-C/D-C/D'-D'-H-K-L
 F-E-B-A-C-C/D-C/D'-D'-H-L
 F-E-B-A-C-C/D-C/D'-D'-H-K-L

F-E-B-A-G-C-C/D-D
 F-E-B-A-G-C-C/D-H
 F-E-B-A-G-C-C/D-H-L
 F-E-B-A-G-C-C/D-H-K-L
 F-E-B-A-G-C-C/D-D'-H
 F-E-B-A-G-C-C/D-D'-H-L
 F-E-B-A-G-C-C/D-D'-H-K-L
 F-E-B-A-G-C-C/D'-D
 F-E-B-A-G-C-C/D'-H
 F-E-B-A-G-C-C/D'-H-L
 F-E-B-A-G-C-C/D'-H-K-L
 F-E-B-A-G-C-C/D'-D'-H
 F-E-B-A-G-C-C/D'-D'-H-L
 F-E-B-A-G-C-C/D'-D'-H-K-L
 F-E-B-A-G-C-C/D-C/D'-D
 F-E-B-A-G-C-C/D-C/D'-H
 F-E-B-A-G-C-C/D-C/D'-H-L
 F-E-B-A-G-C-C/D-C/D'-H-K-L
 F-E-B-A-G-C-C/D-C/D'-D'-H
 F-E-B-A-G-C-C/D-C/D'-D'-H-L
 F-E-B-A-G-C-C/D-C/D'-D'-H-K-L
 F-E-B-A-G-C-C/D-C/D'-D'-H-L
 F-E-B-A-G-C-C/D-C/D'-D'-H-K-L

FIG. 37B
**GGF/Heregulin
Splicing Variants**

E-B-A'
E-B-A-C-C/D-D
E-B-A-C-C/D-H
E-B-A-C-C/D-H-L
E-B-A-C-C/D-H-K-L
E-B-A-C-C/D-D'-H
E-B-A-C-C/D-D'-H-L
E-B-A-C-C/D-D'-H-K-L
E-B-A-C-C/D'-D
E-B-A-C-C/D'-H
E-B-A-C-C/D'-H-L
E-B-A-C-C/D'-H-K-L
E-B-A-C-C/D'-D'-H
E-B-A-C-C/D'-D'-H-L
E-B-A-C-C/D'-D'-H-K-L
E-B-A-C-C/D-C/D'-D
E-B-A-C-C/D-C/D'-H
E-B-A-C-C/D-C/D'-H-L
E-B-A-C-C/D-C/D'-H-K-L
E-B-A-C-C/D-C/D'-H
E-B-A-C-C/D-C/D'-H-L
E-B-A-G-C-C/D-D
E-B-A-G-C-C/D-H
E-B-A-G-C-C/D-H-L
E-B-A-G-C-C/D-H-K-L
E-B-A-G-C-C/D-D'-H
E-B-A-G-C-C/D-D'-H-L
E-B-A-G-C-C/D-D'-H-K-L
E-B-A-G-C-C/D'-D
E-B-A-G-C-C/D'-H
E-B-A-G-C-C/D'-H-L
E-B-A-G-C-C/D'-H-K-L
E-B-A-G-C-C/D'-D'-H
E-B-A-G-C-C/D'-D'-H-L
E-B-A-G-C-C/D'-D'-H-K-L
E-B-A-G-C-C/D-C/D'-D
E-B-A-G-C-C/D-C/D'-H
E-B-A-G-C-C/D-C/D'-H-L
E-B-A-G-C-C/D-C/D'-H-K-L
E-B-A-G-C-C/D-C/D'-D'-H
E-B-A-G-C-C/D-C/D'-D'-H-L
E-B-A-G-C-C/D-C/D'-D'-H-K-L

FIG. 38
EGFL1

SEQ_ID NO: 154:

FIG. 39

EGFL2

SEQ ID NO: 155:

AGC	CAT	CTT	GTC	AAG	TGT	GCA	GAG	AAG	GAG	AAA	ACT	TTC	TGT	GTG	AAT
Ser	His	Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Lys	Thr	Phe	Cys	Val	Asn
GGG	GGC	GAG	TGC	TTC	ATG	GTG	AAA	GAC	CTT	TCA	AAT	CCC	TCA	AGA	TAC
Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr
TTG	TGC	AAG	TGC	CAA	CCT	GGA	TTC	ACT	GGA	GCG	AGA	TGT	ACT	GAG	AAT
Leu	Cys	Lys	Cys	Gln	Pro	Gly	Phe	Thr	Gly	Ala	Arg	Cys	Thr	Glu	Asn
GTG	CCC	ATG	AAA	GTC	CAA	ACC	CAA	GAA	AAA	GCG	GAG	CTC	TAC	TAA	
Val	Pro	Met	Lys	Val	Gln	Thr	Gln	Glu	Lys	Ala	Glu	Glu	Leu	Tyr	

FIG. 40

EGFL3

SEQ ID NO: 156:

AGC	CAT	CTT	GTC	AAG	TGT	GCA	GAG	AAG	GAG	AAA	ACT	TTC	TGT	GTG	AAT	48
Ser	His	Leu	Val	Lys	Cys	Ala	Glu	Lys	Glu	Thr	Phe	Cys	Val	Asn		
GGA	GGC	GAG	TGC	TTC	ATG	GTC	AAA	GAC	CTT	TCA	AAT	CCC	TCA	AGA	TAC	96
Gly	Gly	Glu	Cys	Phe	Met	Val	Lys	Asp	Leu	Ser	Asn	Pro	Ser	Arg	Tyr	
TTG	TGC	AAG	TGC	CCA	AAT	GAG	TTT	ACT	GGT	GAT	CGC	TGC	CAA	AAC	TAC	144
Leu	Cys	Lys	Cys	Pro	Asn	Glu	Phe	Thr	Gly	Asp	Arg	Cys	Gln	Asn	Tyr	
GTA	ATG	GCC	AGC	TTC	TAC	AAA	GCG	GAG	GAG	CTC	TAC	TAA				183
Val	Met	Ala	Ser	Phe	Tyr	Lys	Ala	Glu	Glu	Leu	Tyr					

FIG. 4-1

SEQ ID NO: 157:

FIG. 42
EGFL5

SEQ ID NO: 158:

FIG. 43
EGFL6

SEQ ID NO: 159:

FIG. 44
GGF2HBSS5

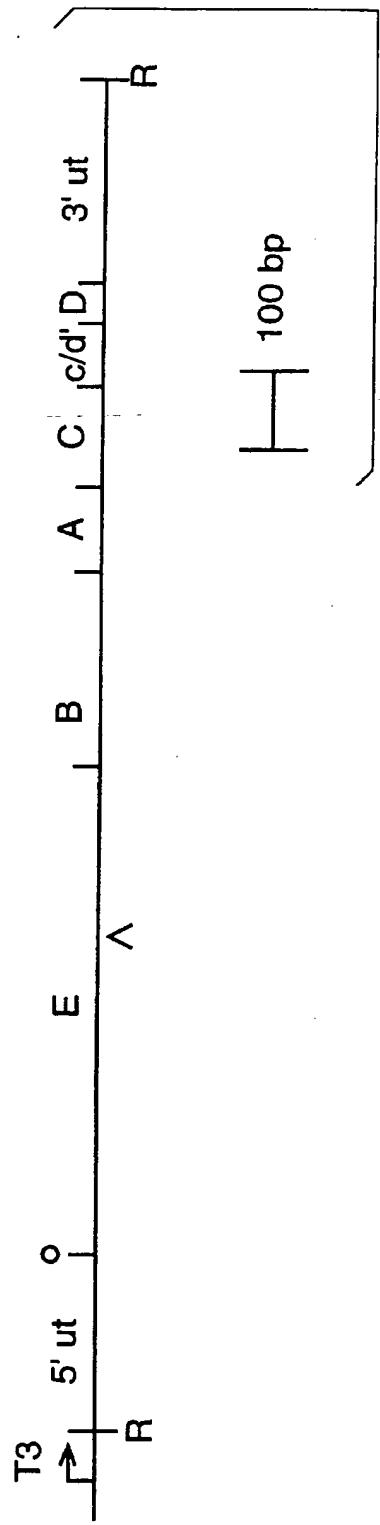


FIG. 45A

Nucleotide Sequence & Deduced Acid Sequence of GGF2HBSS5

SEQ ID NO: 21:

GGAAATTCCCTT TTTTTTTTTT TTTCCTTCTT NNNTTTTTTTT TGCCCTTATA CCTCTTCGCC
TTTCTGTGGT TCCATCCACT TCTTCCCCCT CCTCCCTCCA TAAACAACTC TCCTAACCT 60
GCACCCCAA TAAATAATA AAAGGAGGAG GGCAAGGGGG GAGGAGGGG AGTGGTGTGCTG
CGAGGGAG GAAAAGGGAG GCAGGCCGAG AAGAGGCCGG CAGAGTCCGA ACCGACAGCC 120
AGAAGCCGC ACGCACCTCG CACC ATG AGA TGG CGA CGC GCC CCG CGC CGC
Met Arg Trp Arg Arg Ala Pro Arg Arg Arg Arg Arg Arg Arg Arg Arg 180
TCC GGG CGT CCC GGC CCC CGG GCC CAG CGC CCC GGC TCC GCC GCC CGC CGC
Ser Gly Arg Pro Gly Pro Arg Ala Gln Arg Pro Gly Ser Ala Ala Arg 240
TCG TCG CCG CCG CTG CTG CCA CTA CTG CTG CTG CTG CTTG GGG ACC
Ser Ser Pro Pro Leu Pro Leu Leu Pro Leu Leu Leu Leu Gly Thr 300
Val Cys Leu Leu Thr Val Val GGF-II 09 339
GGG GCC CTG GCG CCC GGG GCG GCG GCC GGC AAC GAG GCG GCT CCC GCG
Ala Ala Leu Ala Pro Gly Ala Ala Ala Gly Asn Glu Ala Ala Pro Ala 387
Ala Ala Leu Pro Pro 435
GGG GCC TCG GTG TGC TAC TCG TCC CCG CCC AGC GTG GGA TCG GTG CAG
Gly Ala Ser Val Cys Tyr Ser Ser Pro Pro Ser Val Gly Ser Val Gln 483
Ala Ser Pro Val Ser Val Gly Ser Val Gln GGF-II 08
GAG CTA GCT CAG CGC CGC GCG GTG ATC GAG GGA AAG GTG CAC CCG
Glu Leu Ala Gln Arg Ala Ala Val Val Ile Glu Gly Lys Val His Pro 531
Glu Leu Val Gln Arg Trp Phe Val Val Ile Glu Gly Lys GGF-II 04

FIG. 45B

Nucleotide Sequence & Deduced Acid Sequence of GGF2HBSS5

CAG CGG CGG CAG CAG GGG GCA CTC GAC AGG AAG GCG GCG GCG GCG	Gln Arg Arg Gln Gln Gly Ala Leu Asp Arg Lys Ala Ala Ala Ala Ala	579
GGC GAG GCA GGG GCG TGG GGC GAT CGC GAG CCG CCA GCC GCG GCG	Gly Glu Ala Gly Ala Trp Gly Asp Arg Glu Pro Pro Ala Ala Gly	627
CCA CGG GCG CTG GGG CCG CCC GCC GAG CCG CTG CTC GCC AAC	Pro Arg Ala Leu Gly Pro Pro Ala Glu Glu Pro Leu Leu Ala Ala Asn	675
GGG ACC GTG CCC TCT TGG CCC ACC GCC CCG GTG CCC AGC GCC GAG	Gly Thr Val Pro Ser Trp Pro Thr Ala Pro Val Pro Ser Ala Gly Glu	723
CCC GGG GAG GCG CCC TAT CTG GTG AAG GTG CAC CAG GTG TGG GCG	Pro Gly Glu Glu Ala Pro Tyr Leu Val Lys Val His Gln Val Trp Ala	771
GTG AAA GCC GGG GGC TTG AAG GAC TCG CTG CTC ACC GTG CGC CTG	Val Lys Ala Gly Gly Leu Lys Lys Asp Ser Leu Leu Val Arg Leu	819
Gly Ala Lys	Asp Leu Leu Xaa Val	GGF-II 10
GGG ACC TGG GGC CAC CCC GCC TTC CCC TCC TGC GGG AGG CTC AAG GAG	GGF-II 10	867
Gly Thr Trp Gly His Pro Ala Phe Pro Ser Cys Gly Arg Leu Lys Glu	Gly Ala Trp Gly Pro Pro Ala Phe Pro Val Xaa Tyr	
GAC AGC AGG TAC ATC TTC ATG GAG CCC GAC GCC AAC AGC ACC AGC	Asp Ser Arg Tyr Ile Phe Met Glu Pro Asp Ala Asn Ser Thr Ser	915
Tyr Ile Phe Phe Met Glu Pro Glu Ala Xaa Ser Ser Ser Gly	GGF-II 02	

FIG. 45C

Nucleotide Sequence & Deduced Acid Sequence of GGF2HBSS5

CGC GCG CCG GCC CCC TTC CGA GCC TCT TTC CCC CCT CTG GAG ACG GGC	963
Arg Ala Pro Ala Ala Phe Arg Ala Ser Phe Pro Pro Leu Glu Thr Gly	
CGG AAC CTC AAG AAG GAG GTC AGC CGG GTG CTG TGC AAG CGG TGC GCC	1011
Arg Asn Leu Lys Lys Glu Val Ser Arg Val Leu Cys Lys Arg Cys Ala	
TTG CCT CCC CAA TTG AAA GAG ATG AAA AGC CAG GAA TCG GCT GCA CGT	1059
Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly	
TCC AAA CTA GTC CTT CGG TGT GAA ACC AGT TCT GAA TAC TCC TCT CTC	1107
Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu	
Leu Val Leu Arg GGF-II 06	
AGA TTC AAG TGG TTC AAG AAT GGG AAT GAA TTG AAT CGA AAA AAC AAA	1155
Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys	
CCA CAA AAT ATC AAG ATA CAA AAA AAG CCA GGG AAG TCA GAA CTT CGC	1203
Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg	
ATT AAC AAA GCA TCA CTG GCT GAT TCT GGA GAG TAT ATG TGC AAA GTRG	1251
Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val	
Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met xaa Lys GGF-II 12	
ATC AGC AAA TTA GGA AAT GAC AGT GCC TCT GCC AAT ATC ACC ATC GTG	1299
Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val	
GAA TCA AAC GCT ACA TCT ACA TCC ACC ACT GGG ACA AGC CAT CTT GTA	1347
Glu Ser Asn Ala Thr Ser Thr Ser Thr Gly Thr Ser His Leu Val	

FIG. 45D

Nucleotide Sequence & Deduced Acid Sequence of GGF2HBSS

FIG. 46
Schwann Cell Proliferation Assay

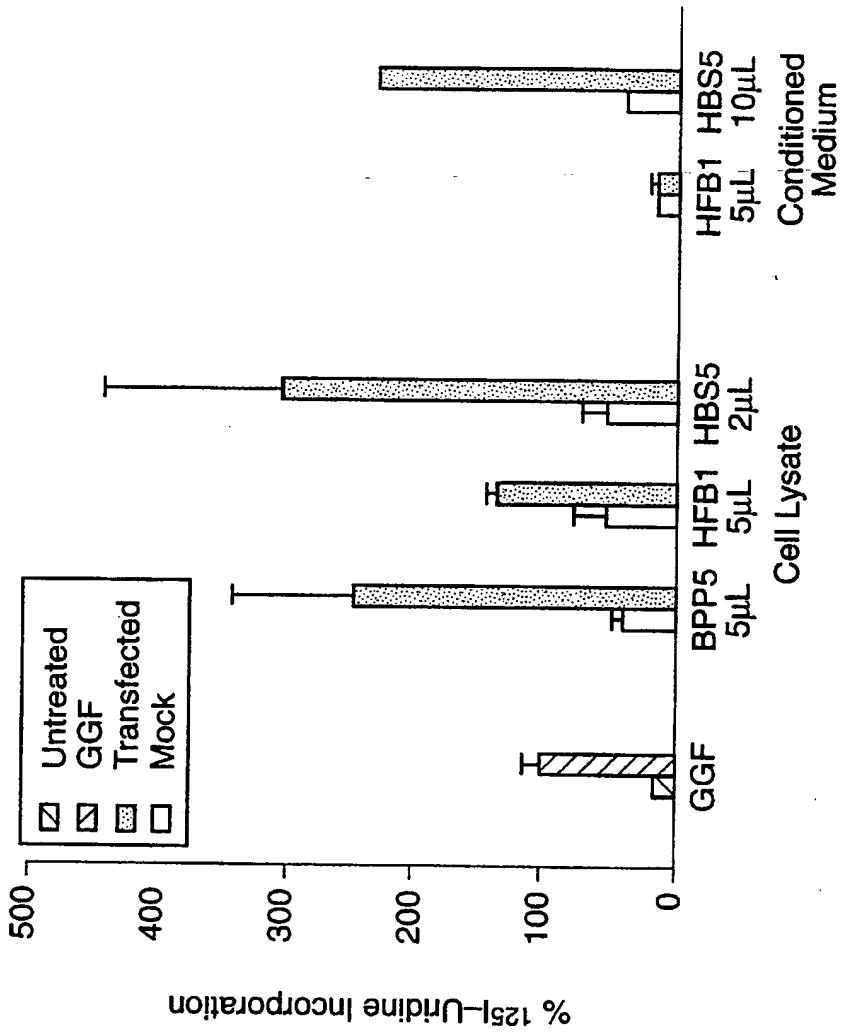


FIG. 47

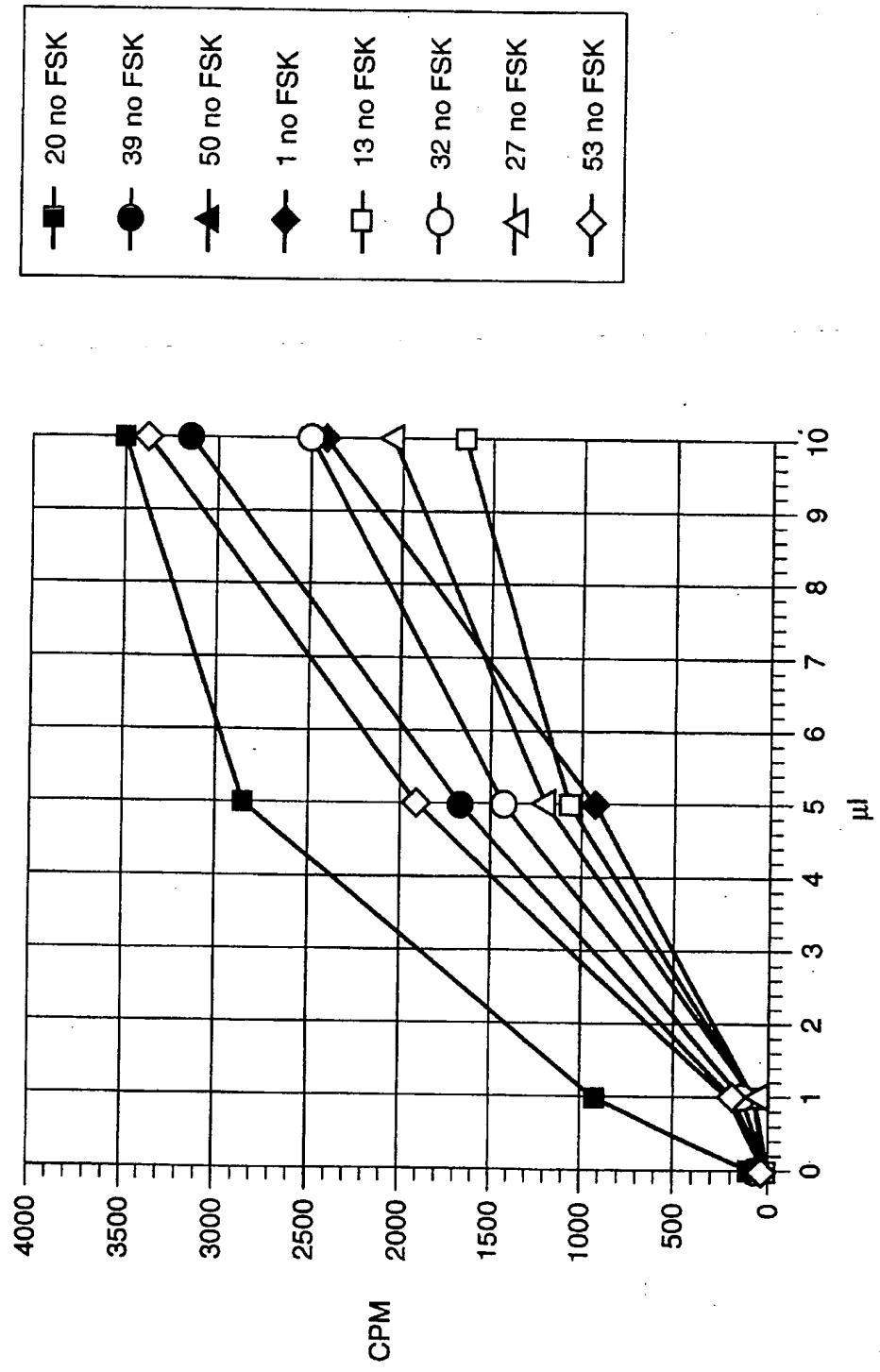


FIG. 48
Schwann Cell Assay/Baculovirus Clones

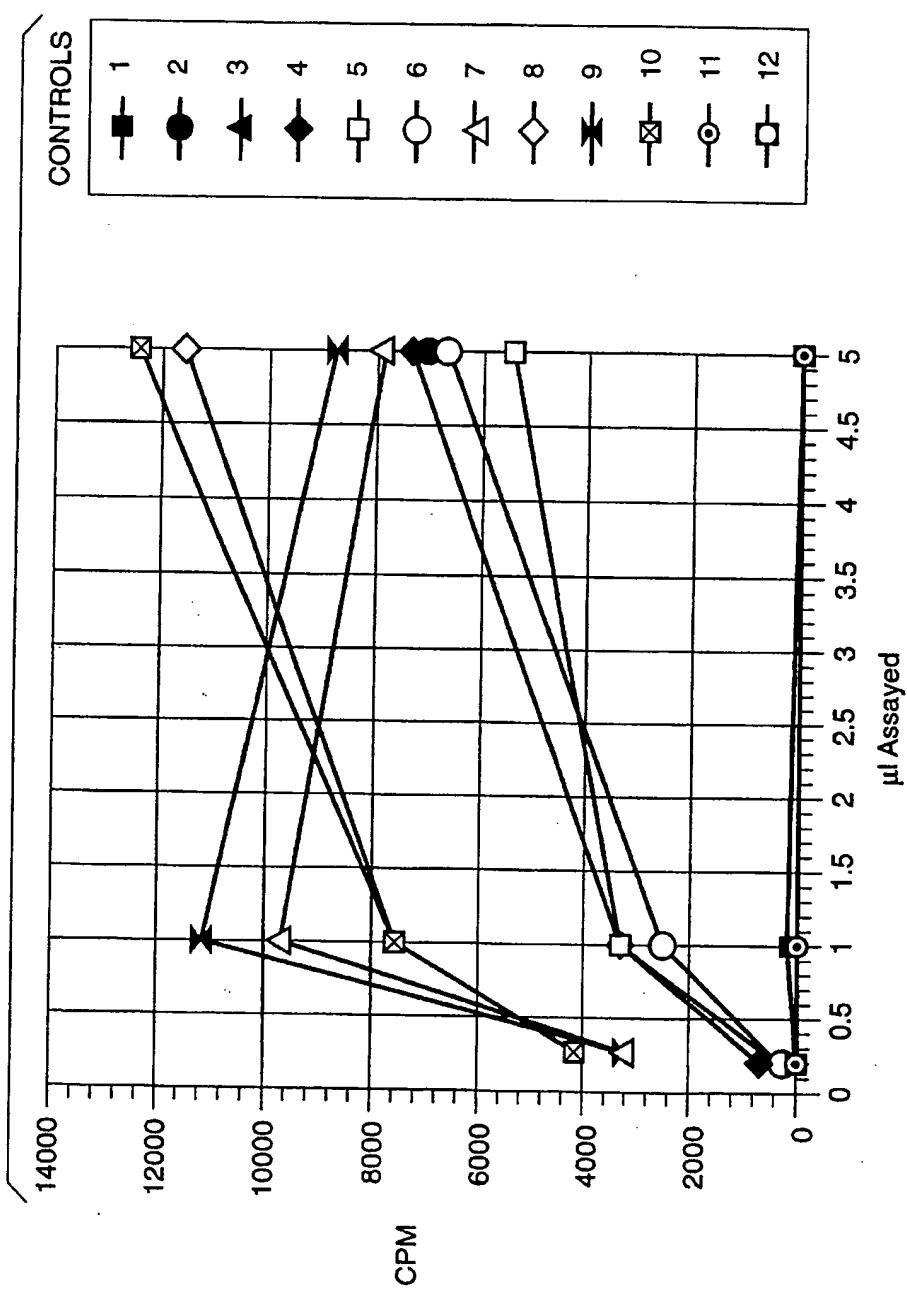


FIG. 49

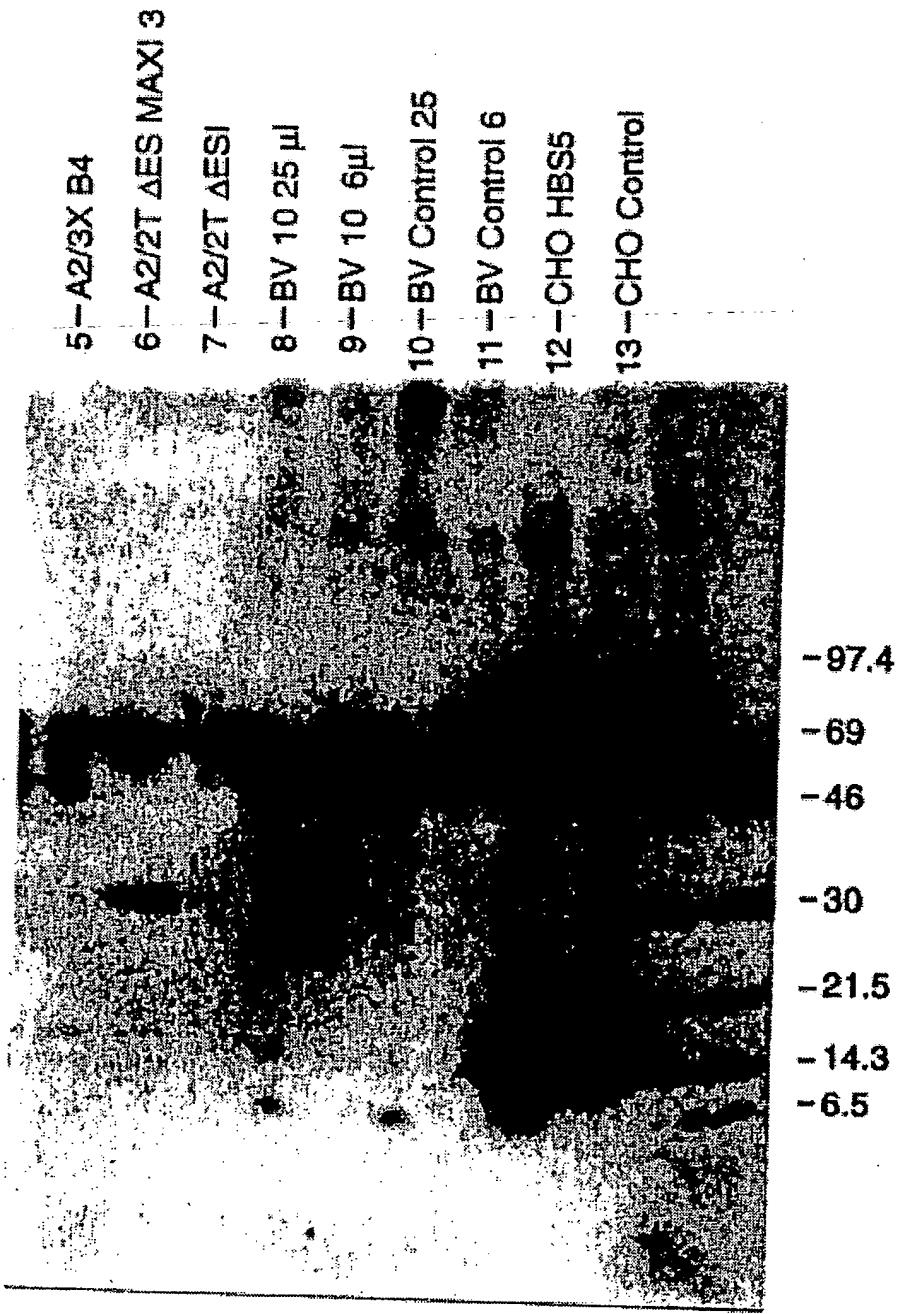


FIG. 50A

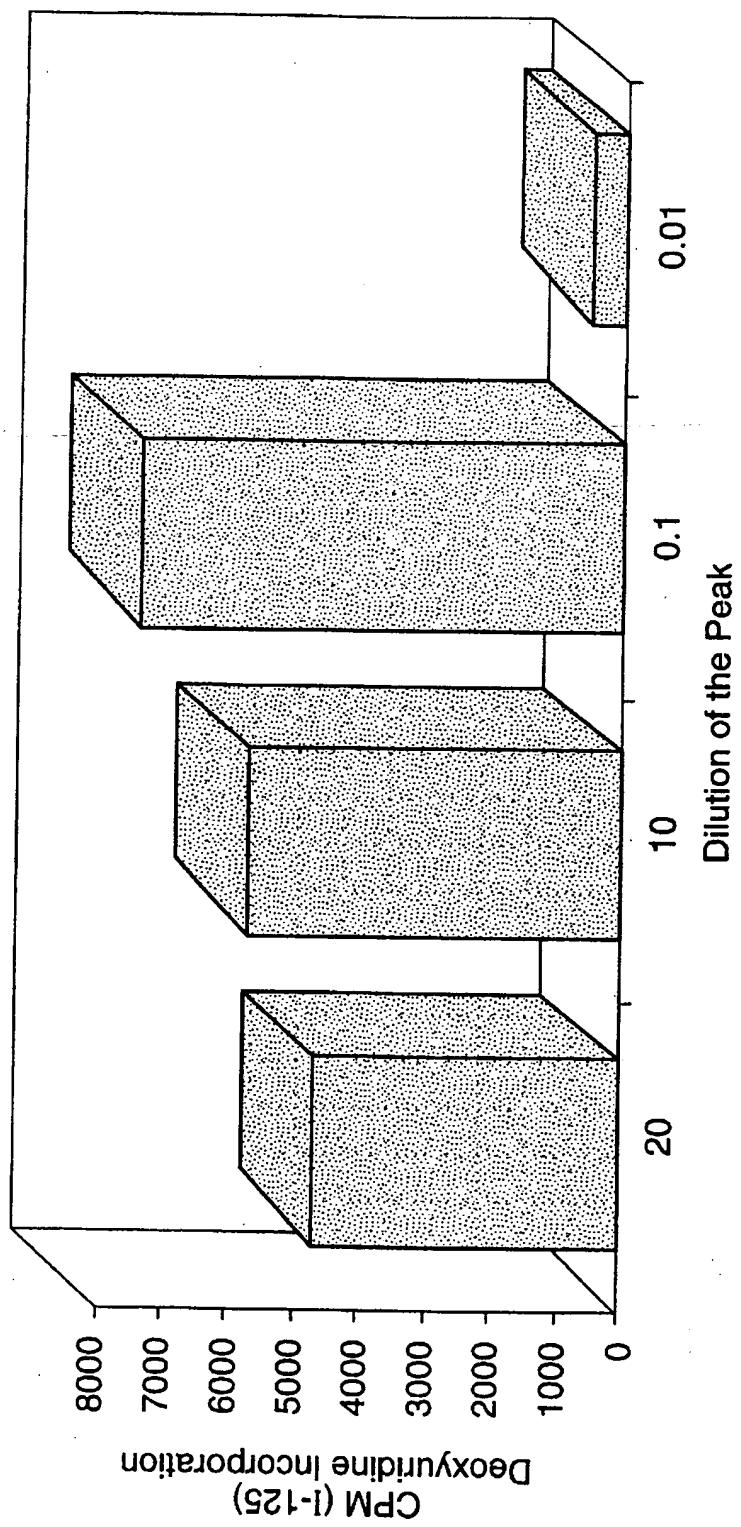


FIG. 50B

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

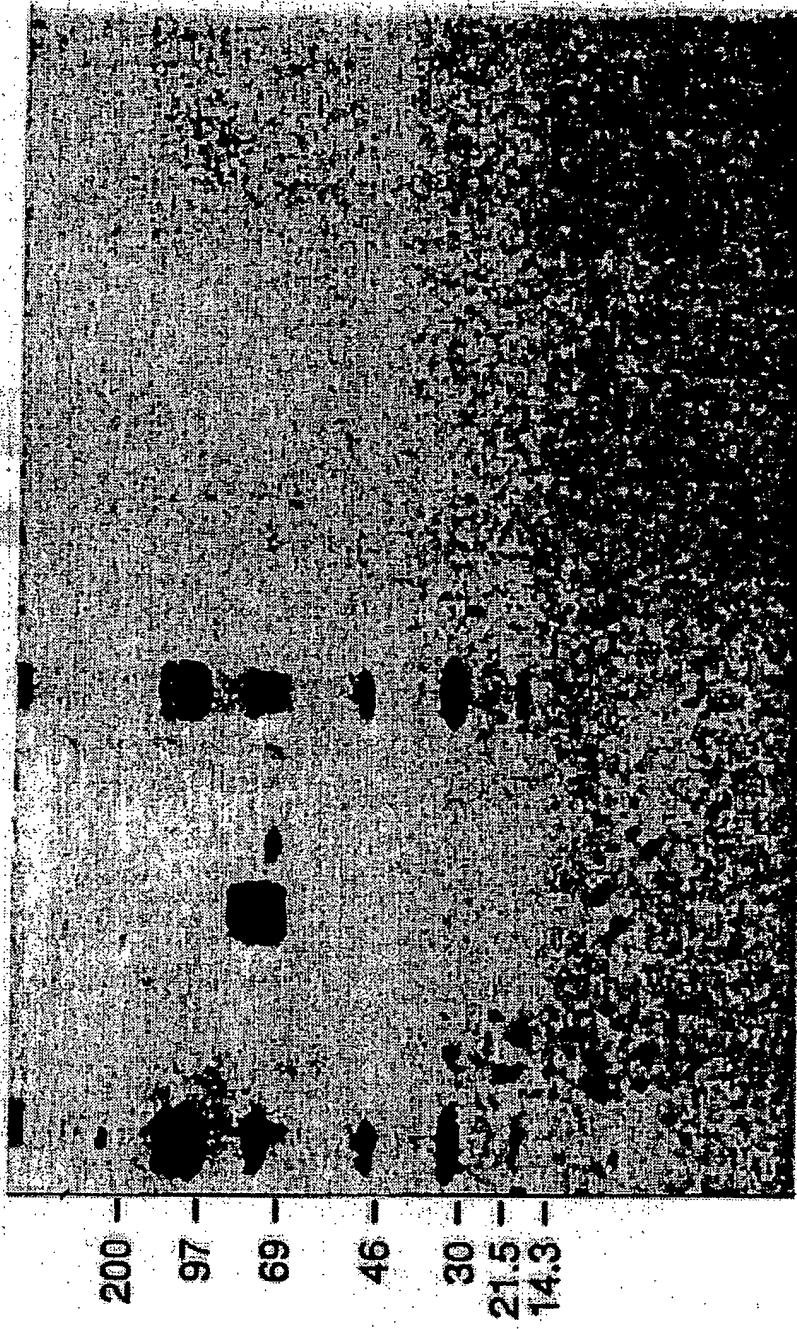


FIG. 51
rGGF Purification on Cation Exchange Column

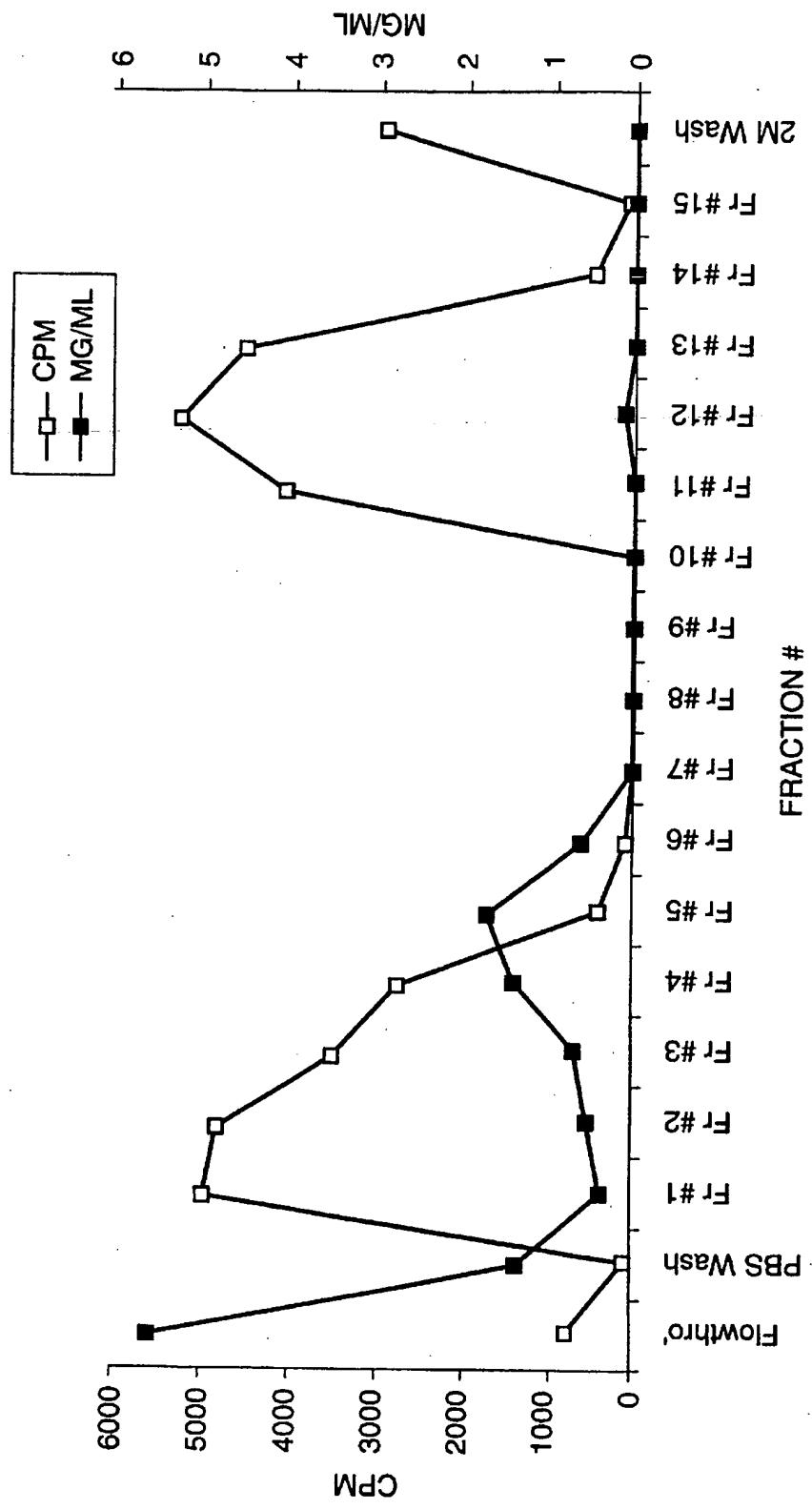


FIG. 51A

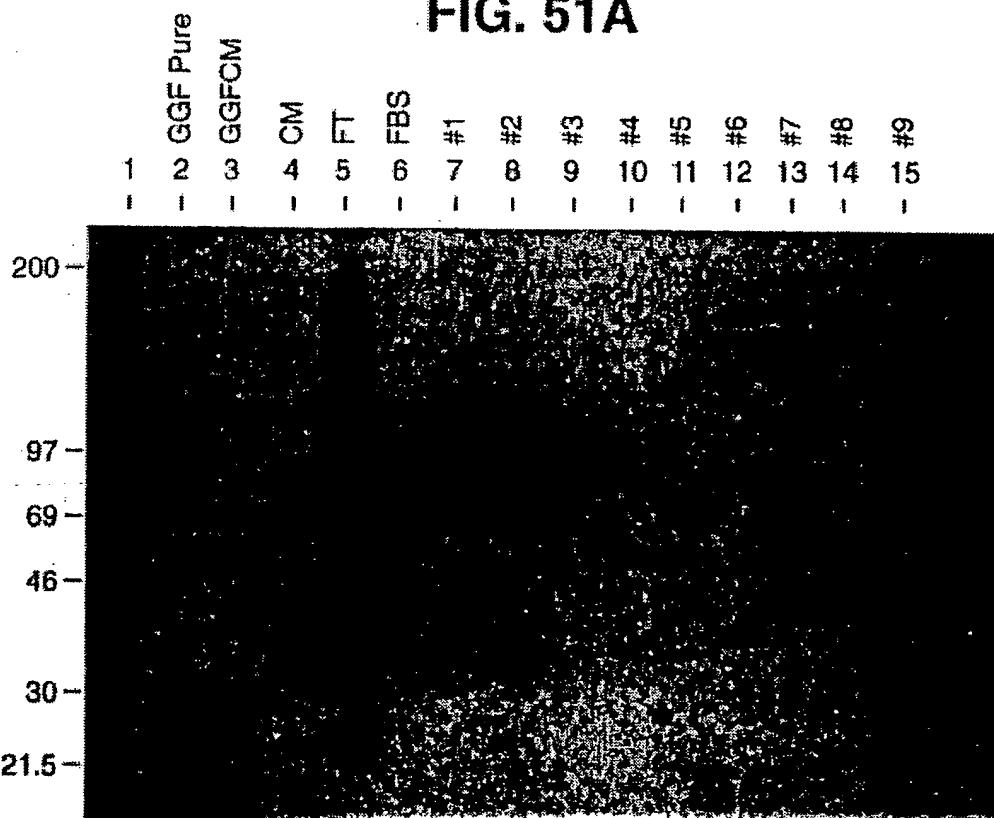


FIG. 51B

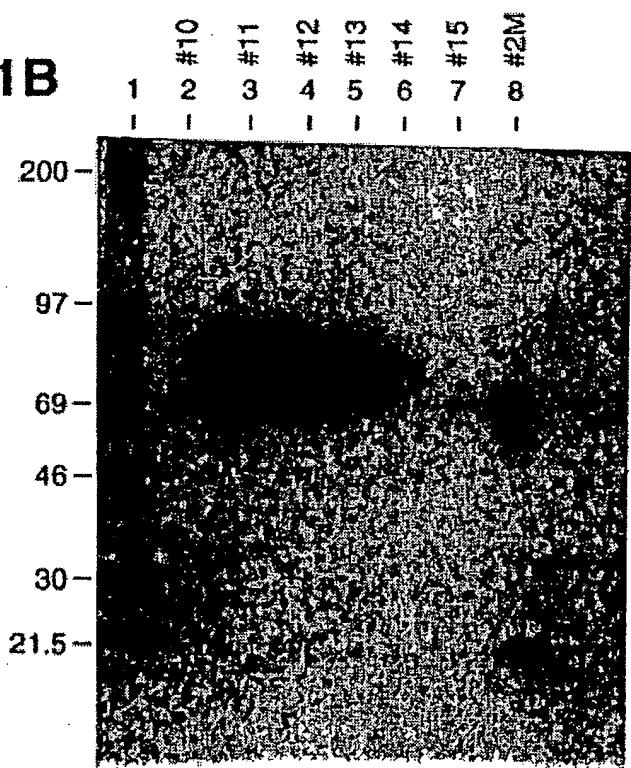
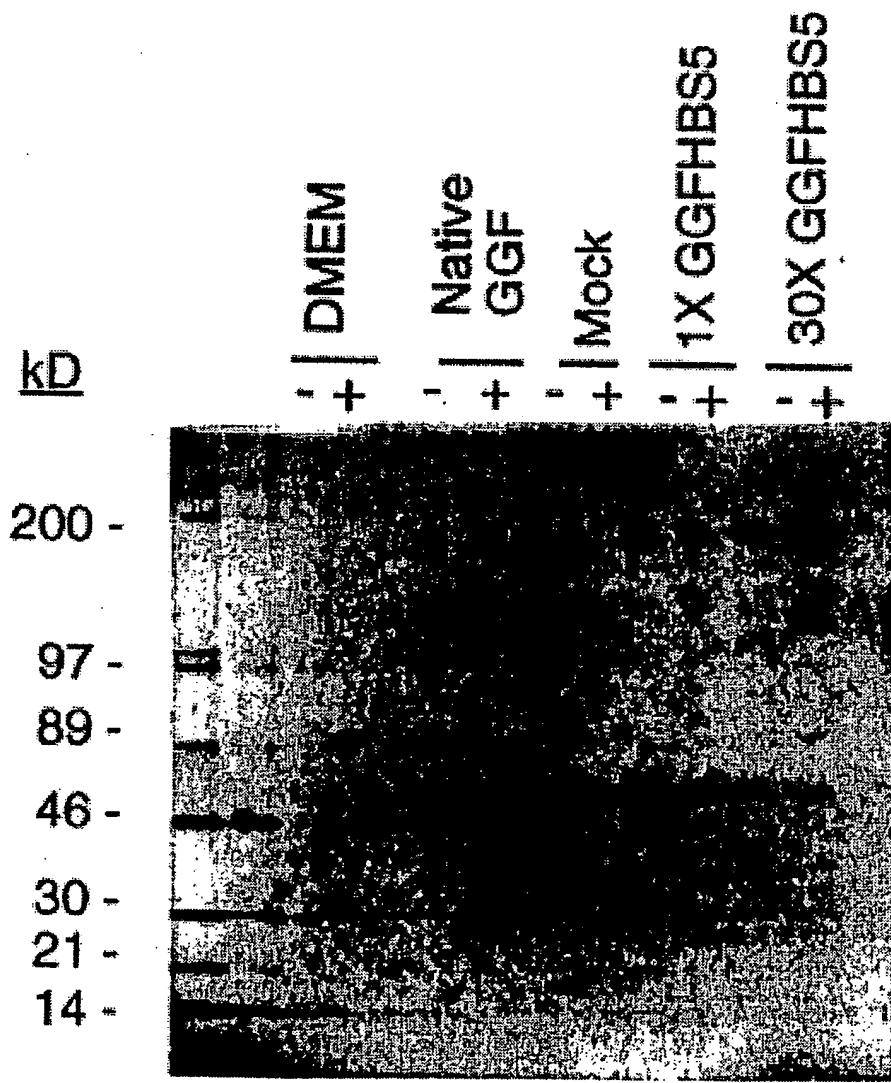


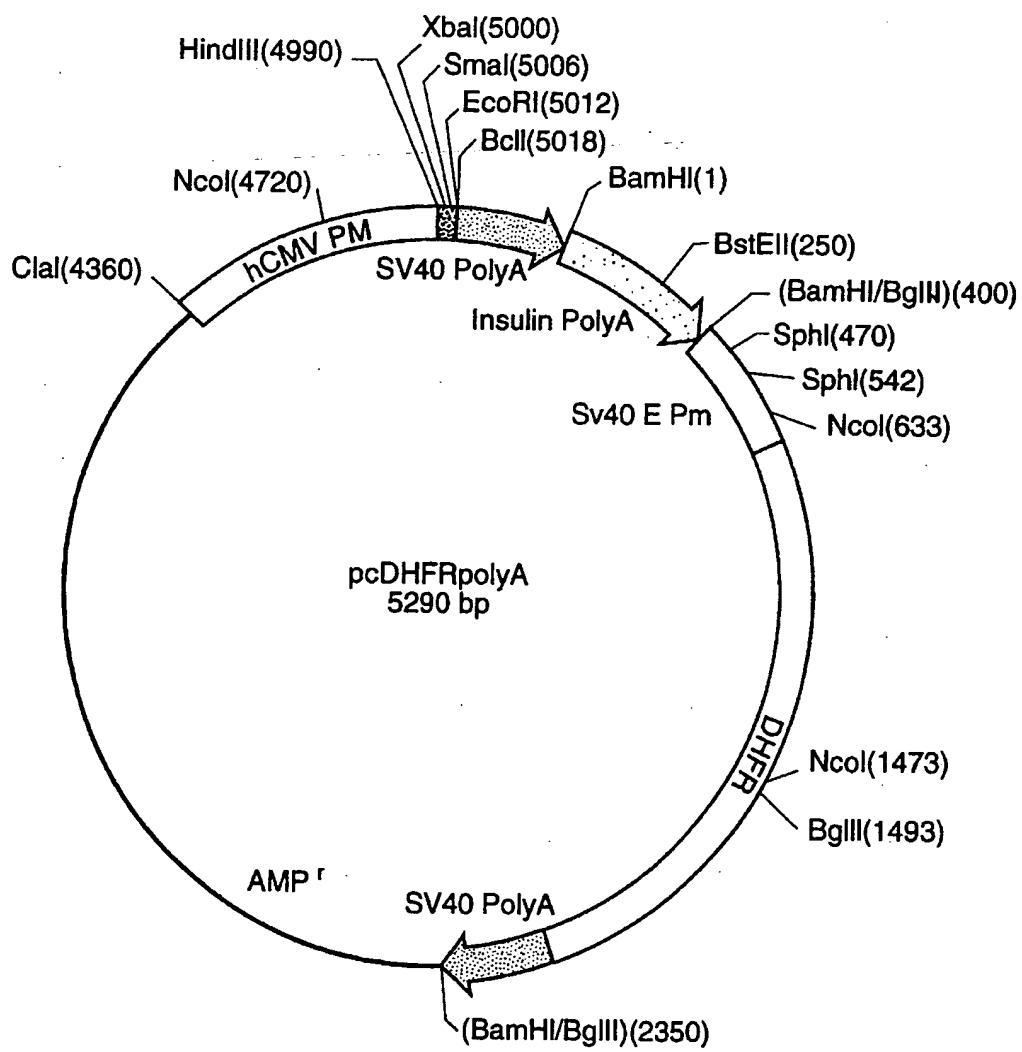
FIG. 52



SEQ ID NO:170	GGFBSS	1	MRMRRAPRRSGRPRAQRPGSAARSSPPPLPLLLLCTAAALAPGAAAGNEAAPAGAS			
		II-4	II-8			
61	VCYSSPPSVGSVQELAQRMAAVVIEGKVRPQRQQALDRKAAAAGEAGAWGGDREPPAA	O	O	II-10		
121	GPRALGPPAEEPLLAAANGTVPSWPTAPVPSAGEPGEAAYVLVKVHQVWAKAGGLKKDSL	O	O	II-1		
181	LTVRLGTWGHPAPPSCGRLKEDSRYIFFMEPDANSTSRAAAFRASFPPELETGRNLKKEV	O	O	II-2		
			2	3		
SEQ ID NO: 171	GGFBFB1	241	SRVLCKRC	▼		
SEQ ID NO: 172	GGFBPP5	1	O OM SER K E G R G K G K K E R G S G K K P E E A A G S Q S P	ALPPQLKEMKSQESAAAGSK		
		1	R K G D VP GP R R V	R		
268	LVLR CET S SE Y S L R F K N F K G N E L N R K N K P Q N I K I Q K K P G K S E L R I N K A S L A D S G E Y M C	II-6	II-14	II-11		
53	*	53	LVLR CET S SE Y S L R F K N F K G N E L N R K N K P Q N I K I Q K K P G K S E L R I N K A S L A D S G E Y M C	II-18	II-12	I-7, III-12,
		*				III-13
328	KVISKLGNDSASANITIVESN	4	K II-12	5		
113	EII T GMP ASTEGAY SSESPIRISVSTEGANTSSS	113	T T	T	ATSTS	
					T	
354	TTGTSHLVKAERKEKTFCVNGGECFMVKDSLNSPNSRVLCKCPNEFTGDRCQNYMASFYST	173	6	II-15	8	▼
173	A	173	*	*	*	ATSTS
413	STPFLSLPE*	9				
232						
232						

FIG. 53

FIG. 54



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